

G. T. SURVEY OF INDIA



SYNOPSIS OF THE RESULTS OF THE OPERATIONS OF
THE GREAT TRIGONOMETRICAL SURVEY OF INDIA
VOLUME XIV.

DESCRIPTIONS AND CO-ORDINATES
OF THE
PRINCIPAL AND SECONDARY STATIONS AND OTHER FIXED POINTS OF
THE BUDHON MERIDIONAL SERIES
OR SERIES J
OF THE
NORTH-EAST QUADRILATERAL.

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1883.

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ERRATA ET ADDENDA.

- 5—*J.* line 21 from bottom *for* surmounted by *read* about 20 feet to the east of
 15—*J.* after Triangle No. 57 *insert* the following triangles:—

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
57 _a	Mahesari, LII	1°05	31 17 35·66	4·9420246	87503·4	16·573
	Mábegarh, I	1°05	65 23 37·74	5·1851627	153166·1	29·009
	Chándípahár, LIV	1°05	83 18 46·60	5·2235428	167318·0	31·689
57 _b	Mahesari, LII	·98	66 5 4·25	5·1541808	142620·1	27·011
	Chándípahár, LIV	·98	34 52 53·06	4·9504707	89221·7	16·898
	Godhna, XLIX	·99	79 2 2·69	5·1851627	153166·1	29·009

NOTE.—Stations XLIX, LII and LIV appertain to the Great Arc Meridional Series, Section 24° to 30°, of the North-West Quadrilateral, and I appertains to the North-East Longitudinal Series of the North-East Quadrilateral.

- 23—*J.* line 14 from top, col. 5 *for* Tinsmál, VII* *read* Tinsmál, VII*
 „ in cols. 5 and 6 *after* line 6 from bottom *insert* Mahesari, LII 4 34 26·63 |57_a|
 „ „ „ „ 1 „ „ Mábegarh, I 281 15 38·98 |57_a|
 24—*J.* „ 3 and 4 „ „ 16 „ „ Mahesari, LII 298 20 54·38 |57_b|
 25—*J.* „ „ „ „ 2 „ „ Chándípahár, LIV 101 23 45·00 |57_a|
 „ „ 5 and 6 „ „ 16 from top „ Godhna, XLIX 118 28 12·87 |57_b|
 „ „ „ „ „ Chándípahár, LIV 184 33 18·10 |57_a|
 27—*J.* az. of Rámghat House, col. 1 *for* 112° 34' 30' *read* 141° 1' 22"
 30—*J.* line 14 from top, col. 2 „ No. 79 „ No. 57_a
 33—*J.* lines 21 & 22 from top, col. 3 „ Moradabad s. on Collec- „ Moradabad Collector's Kachahri
 „ „ „ „ „ tor's Kachahri Staircase.
 34—*J.* latitude and longitude of Rámghat House „ { 28° 5' 42"·2 { 28° 9' 0"·6
 „ „ „ „ { 78 25 45·4 { 78 28 32·5

January, 1883.

J. B. N. HENNESSEY,
In charge of Computing Office.

REFERENCES.



The abbreviations employed in the text are as follows:—

h.s. denotes hill station secondary

s. „ station secondary

These abbreviations are only placed after stations where a theodolite has been set up and observations taken to surrounding points.

The latitudes and longitudes of all points shown on the Charts at the end of this volume will be found in the text. The latter exhibits numerical values of triangles only to points of a superior class, to which alone, if exhibited on the Charts, lines are drawn: these lines are either continuous throughout, or dotted for half the length and continuous for the other half: the dots indicate that the bearing was not observed, and in such cases numerical values of azimuths are not given. For other points, difficult to identify or of comparatively less accuracy, numerical values of triangles or azimuths are not given.

January, 1883.

J. B. N. HENNESSEY,

In charge of Computing Office.

P R E F A C E.

The Budhon Meridional Series is the westernmost of all the meridional chains of triangles included in the Section of the Principal Triangulation of the Survey of India which has been named the North-East Quadrilateral. This Section embraces the area within the Meridians of 78° and 92° and the Parallels of 23° and 30° ; and for reasons explained in Section 7 of Chapter I of Volume II of the *Account of the Operations of the Great Trigonometrical Survey*, its general reduction was postponed till that of the neighbouring Quadrilaterals, *viz.*, the North-West and South-East, had been completed, whereby two of the Series, the Great Arc, Section 24° to 30° , and the Calcutta Longitudinal, entering the periphery of the North-East Quadrilateral, became finally fixed. When the reduction of this Quadrilateral came to be taken in hand it was found that the Budhon Series, while emanating from the Calcutta Longitudinal Series, and terminating on the Great Arc Series, Section 24° to 30° —the two Series above mentioned—was so slightly connected with the rest of the triangulation of the North-East Quadrilateral, that the mutual influence would be practically imperceptible. It was therefore determined to reduce the Series by itself. The general principles of the Simultaneous Reduction of the Series and the procedure followed in carrying it out, are the same as have been explained in Volume II of the *Account of the Operations, &c.* An abstract of the reduction itself is given in Appendix No. 1 to Part I of Volume VII, and all other details of the principal triangulation are given in Part II of that Volume.

As however the entire contents of the volumes of the principal triangulation are not needed by geographers and surveyors, and moreover as these volumes give no details of the secondary triangulation—which is of considerable value for local requirements—it is obviously desirable that synopses of the final results of the whole of the operations, including the secondary as well as the principal triangulations, should be published for general use, in such a form as to be most suitable for convenience of reference. This has already been done for the several Series forming the North-West Quadrilateral, as follows:—

- I. Great Indus Series.
- II. Great Arc, Section 24° to 30° .
- III. Karáchi Longitudinal Series.
- IV. Gurhágárh Meridional Series.
- V. Rahún Meridional Series.
- VI. Jogí-Tíla and Suttlej Series.
- VII. North-West Himalaya Series.

And for the following Series of the South-East Quadrilateral, *viz.*,

- VIII. Great Arc, Section 18° to 24° .
- IX. Jabalpur Meridional Series.
- X. Bider Longitudinal Series.
- XI. Biláspur Meridional Series.
- XII. Calcutta Longitudinal Series.
- XIII. East Coast Series.

} Already published.

The present is the 14th Synoptical Volume and the first of those appertaining to the North-East Quadrilateral, and it gives the results of the whole of the triangulation, both the principal, which was executed with theodolites having azimuthal circles of 15 and 18 inches in diameter read by 3 micrometer microscopes, and the secondary, which was executed with smaller theodolites, having circles of 7 to 12 inches in diameter, read by verniers.

BUDHON MERIDIONAL SERIES.

BUDHON MERIDIONAL SERIES—(LONG. $78^{\circ} 30'$)

INTRODUCTION.

In the year 1830 when the first measurement of the Calcutta Longitudinal Series was approaching completion, the Hon'ble the Court of Directors of the East India Company expressed a wish that a number of series of triangles should be carried northwards and southwards from certain sides of this triangulation, in order to connect together the isolated surveys which had already been made in various provinces and districts, and to furnish reliable bases for future surveys. The Surveyor General—then Captain G. Everest of the Bengal Artillery—in an exhaustive letter dated 12th October 1831, discussed all preliminaries for giving effect to the wishes of the Hon'ble Court, in regard to the number of the series to be undertaken, the character of the country to be traversed by each, the necessary additions to the then-existing establishment, and the probable cost of the operations.

During the year 1831-32 the requisite instruments for carrying out this scheme of triangulation were procured and instruction given to the officers and assistants selected for the work—one of a high order of accuracy—in which they had had no previous experience.

The first series undertaken was the Budhon, one of the 13 meridional chains now included in the North-East Quadrilateral. It follows the meridian of $78^{\circ} 30'$ as nearly as was practicable, and lies immediately to the east of the Northern Section of the Great Arc Series (E. Long. 78° and N. Lat. 24° to 30°). It was begun in 1832-33 at its southern end in the Saugor (Ságar) District, based on the side Budhon-Tinsmál of the Calcutta Longitudinal Series.

For about the first two and a half degrees (155 miles) of its length it was carried for the most part as a single chain of triangles across the north-eastern spurs and outliers of the Vindhya range which forms the southern watershed of the great Gangetic plain, traversing the modern districts of Saugor, Lalitpur, and Jhánsi, the Native States at the N. W. corner of Bundelkhand, and that of Gwalior, in which a good many secondary stations and places of interest or importance were fixed, including Tehri, the ancient town of Orchha and its modern successor Jhánsi, Datia, Narwar, and Gwalior.

To the north of Gwalior the Series left the hills and descended into the valley of the Chambal and Jumna, requiring henceforward the aid of towers and the heavy labour of ray-clearing, which greatly retarded its progress. Leaving Gwalior it passed through the districts of Agra, Mainpuri, Etah and Aligarh, striking the Ganges in latitude 28° , whence it was con-

tinued as a double series, with shorter sides, arranged in five polygonal figures, to its northern limit about latitude 30° where it reached the outlying hills at the foot of the Himalayas and closed upon stations of the Great Arc and N. E. Longitudinal Series, having traversed the districts of Budaun, Moradabad, Bijnor, and Muzaffarnagar, with one station in the Taráí and two in British Garhwál. The Budhon Series was brought to a close in the year 1842-43, a period of ten years having been occupied in completing about six degrees of distance along the meridian or about 400 miles.

The officer selected for the conduct of this Series was Lieutenant Roderick Macdonald of the 69th Bengal Native Infantry, an officer of the Revenue Survey who had been reported by the head of that department as "well fitted for employment in the Great Trigonometrical Survey and desirous of obtaining it". He was appointed a Second Assistant in the Department in March 1832, and in October the sanction of Government was obtained for a party to be employed under his orders, as follows:—A Principal and one Junior Sub-Assistant with a Native Establishment of the usual strength.

The party was organized in Calcutta under the supervision of the Surveyor General

1st Season 1832-33.

PERSONNEL.

Lieut. R. Macdonald, 2nd Assistant.
Mr. W. N. James, Principal Sub-Assistant.
" J. H. Scully, 3rd Class "

Subsequently in March 1833.

" E. Cropley, 3rd Class Sub-Assistant.
" R. Loane, " "

himself, and started on its long march to the field on the 23rd November 1832 provided with a 15-inch Theodolite by Harris and Barrow for the principal observations. It reached the town of Saugor (Ságar) on the 28th of January 1833 when a part of the native establishment struck for higher wages, and had to be replaced by new hands picked up on the spot; but Lieutenant Macdonald

pushed on and arrived at Budhon H. S. his first station, 22 miles N. W. from Saugor, on the 2nd February. This station and that of Tinsmál distant 30 miles to the eastward, defined the west and east ends of the base or side of origin for the new Series. They were both found intact, but much overgrown by jungle infested with wild beasts, since last visited and observed at for the Calcutta Longitudinal Series by Mr. Olliver eight years previously (in 1825).

The selection of the requisite stations in advance was taken in hand at once, and the junior Sub-Assistant sent on to select the best point available in the desired direction and to burn lights thereat; these however could not be seen without some artificial elevation, and it was only on the 23rd February that the final observations at Budhon could be begun. They were finished by the 27th, and the main party marched to Tinsmál where it was found necessary to raise the station platform by 8.5 feet to command the ray to Patna (I)* and overlook a small temple that obstructed the view. Whilst the building was going on, Lieutenant Macdonald proceeded to select the next two stations in advance on the east flank, Dargawa (II) and Dhandkúa (III) and having returned to Tinsmál, completed the observations by the 15th of March. Whilst there, the Surveyor General, who was on his way to resume the operations on the Great Arc, visited the party, and before going on, left two more Sub-Assistants, Messrs. E. Cropley and R. Loane with Lieutenant Macdonald.

* The Roman number in brackets after the name of a station indicates its position in numerical order from south to north.

The signals observed during this season and for some seasons to come, were flags by day and vase-lights by night.

Patna (I) was next visited, but hazy weather prevented the completion of the principal angles before the 23rd of April, the time between the two short periods of clearer weather being utilized by fixing as many secondary stations and points as practicable. Dargawa (II) and Dhandkúa (III) were next visited and the observations completed by the 3rd of May, when the principal observing was stopped by hazy weather and by obstruction met with from the inhabitants, who regarded the survey operations with suspicion and dislike, and hindered the advanced party continually.

Lieutenant Macdonald endeavoured to complete another triangle but failed, although he waited at Sirsaud (afterwards abandoned for Andhiári, IV) from 13th May to 25th June without having a single good night for observing. Indeed, the length of the rays here—over 30 miles—was too great for the requisite visibility at this season, unless the air were cleared by a general fall of rain. The party then went into recess quarters at Saugor.

The out-turn of work for the first season (1832-33) shews but three principal triangles completed, covering about 1000 square miles of country and stretching to a point nearly 50 miles north of the origin of the Series. But a good deal of secondary or minor triangulation had been accomplished, by which a number of points were determined, especially in and around the first triangle, when the weather was comparatively clear and suitable. A few commanding points were selected and observed at whilst marching between the principal stations, whereby many other places and landmarks which could be seen from two or more of the stations were fixed. For this work Lieutenant Macdonald appears to have used his large theodolite, employing his principal Sub-Assistant with a smaller instrument to supplement his work at the minor stations which he was unable to visit, whilst to the junior Sub-Assistant was entrusted the difficult task of selecting and building the principal stations in advance.

At the close of the recess an epidemic fever broke out at Saugor and attacked three

2nd Season 1833-34.

PERSONNEL.

Lieut. R. Macdonald, 1st Assistant.
 " P. Bridgman, Bengal Artillery, 2nd Asst.
 (*sick and ineffective.*)
 Mr. W. N. James, Principal Sub-Assistant.
 " J. H. Scully, 3rd Class " "
 " E. Cropley, " "
 (*died 27th Oct.*) "
 " R. Loane, 3rd Class Sub-Assistant.

of the Sub-Assistants, one of whom, Mr. E. Cropley, died on the 27th October. It may be now noted that Lieutenant Bridgman who had recently been appointed as 2nd Assistant to the party, was prevented by sickness from joining until 15th February 1834 and further incapacitated for field duties until April, when he was entrusted with the execution of a secondary series in the vicinity of Gwalior,

with Mr. Loane for his assistant: but although he kept the field until the end of July he appears to have contributed little or nothing worth mentioning to the season's work. Shortly afterwards he was transferred to the South Párasnáth Series; but his health failed completely, and he died on his voyage home.

The party was thus in fact no stronger than during the previous season, and the persistent opposition of the inhabitants in the Native States, was a source of great hindrance and anxiety; but the results of this season's work proved nevertheless very much more favourable than the preceding or many succeeding seasons, and appear to reflect no little credit on Lieutenant Macdonald and his assistants.

Lieutenant Macdonald took the field about the middle of October 1833, and found that Dhandkúa (III), the terminal station of the previous season, had been destroyed during the recess; this necessitated the remeasurement of the angles thereat, as well as at Patna (I) and Dargawa (II). These were completed by the 18th November, after which the new stations were visited in the following order:—Andhiári (IV), Gwáli (V), Kathera (VI) a remarkable Bundela stronghold, Bhitári (VII) first visit, Algi (VIII) first visit, Bhitári (VII) second visit, Daryapur (IX) first visit, Maharájpur (X), Karaia (XII), Narwar (XI), Algi (VIII) second visit, Daryapur (IX) second visit, Majhár (XIV) and Ráepur (XIII), by the 30th April 1834. No further observations could be made throughout the month of May owing to the hazy weather, and the season's work closed on the side Ráepur (XIII)—Majhár (XIV), on the 1st of June, when the party marched into recess quarters at Agra where it arrived on the 30th.

In all, twelve new principal triangles had been measured, extending the Series to a point near Gwalior, distant 140 miles north of its origin.

The secondary triangulation accomplished this season was considerable, the points fixed being numerous and fairly well spread over the country traversed, including the important towns of Tehri, the ancient Bundela capital Orchha, its modern successor Jhánsi, the large artificial lake Barwa Ságar, Datia, and Gwalior, besides others of less note.

Some of the chief secondary stations were made to form a minor series by which an independent value was obtained of the side Gwáli-Bhitári, as a check against certain unusually large discrepancies in the observations of some of the previous angles.

In addition to the principal and secondary triangulation accomplished, the preliminary selection of the stations in advance was carried to a distance of 60 miles, well into the plains across the Chambal and Jumna rivers, rendering this season's out-turn of work, notwithstanding many drawbacks and hindrances, one of the most successful noticed in this account.

At the commencement of the Budhon Series, the Surveyor General had directed that a connection should be made, as soon as it could be done without going out of the way, with the Great Arc Series adjacent, recently laid out by Mr. Rossenrode but not yet finally observed with the great theodolite.

The first opportunity of carrying out this connection occurred between Jhánsi and Gwalior, where the Great Arc Series approaches the Budhon Series in the secondary hill stations of Ladára and Karaia, and the principal station on the Ráepur hill, the first of which is visible from Algi (VIII), the second from Ráepur (XIII), and both first and second from Maharájpur (X). Lieutenant Macdonald therefore, occupied the sites of the two Great Arc Series secondary stations of Ladára and Karaia as principal stations, rebuilding the platforms, which had been destroyed by the inhabitants from superstitious motives; but he built a fresh principal station on the Ráepur hill, because the Great Arc Series station thereat could not be observed from the Budhon Series side owing to a small temple that occupied the peak of the hill and precluded the establishment of a common station suitable for both series. Thus a hexagonal figure was formed round Maharájpur (X), and, after measuring the angles, Lieutenant Macdonald reported that he had effected a connection with the Great Arc Series on the side Narwar (XI)—Karaia (XII), Narwar being identical with Ladára h.s. of the Great Arc. These two stations being only secondary points this connection could not be accepted. The three prin-

cipal stations of the Great Arc Series, Shergarh, Dhobái, and Ráepur, although they are near to Narwar, Karaia and Ráepur of the Budhon Series, respectively, are in reality different points, and in fact no proper connection was effected. Subsequently however in 1877, the Surveyor General, then Colonel J. T. Walker, R.E., caused a more exact connection to be made between the two principal stations on the Ráepur hill, which were only about 41 feet apart, the temple above mentioned being on the summit of the peak, between them. The details of this connection will be found at page 73—J. of Volume VII of the *Account of the Operations of the Great Trigonometrical Survey of India*.

The Budhon Series had now been carried for one-third of its entire length in two

3rd Season 1834-35.

PERSONNEL.

Lieut. R. Macdonald, 1st Assistant.
Mr. W. N. James, Principal Sub-Assistant.
„ J. H. Scully, 3rd Class „
„ R. Loane, „ „

seasons, to the northern limit of the hilly tract in which it began, and the provision of towers or artificial elevations, to carry the Series across the plain country to the north, became indispensable. The Surveyor General had already applied to the Government to sanction the erection of high

towers for the purpose, like those being built by the Public Works Department for the Great Arc Series, which had been sanctioned during the year 1833. Those towers however promised to be so expensive that the Government hesitated to sanction any more for the time, or until their precise cost was known, and put forward a memorandum by the Hon'ble Colonel Morrison suggesting the adoption of a reflecting circle and a portable wooden mast, in place of a big theodolite and a masonry tower. The Surveyor General could not accept this suggestion, but proposed the construction of a lofty central pier of masonry for the instrument and signals to stand on, supplemented by a scaffolding with a stage for the observatory, the cost of which he estimated at Rs. 140 to Rs. 270; and if this should prove too costly, then he believed that a mast, such as he himself had recently used for the approximate Series of the Great Arc, would answer. He did not think such costly towers as those just erected for the Great Arc necessary, and pointed out the excessive depth given to their foundations by the Public Works Department, by whose officers they were built. Finally he expressed a hope that the Survey Officers should not be required to build their own towers or supervise the expenditure of large sums of public money, having already as much to attend to in their own proper professional line as they could well do. This representation however seems to have produced little or no effect, for we find the surveyors generally from that time forwards building their own towers as best they could, in a more modest but sufficiently effective way; and, notwithstanding some failures, this arrangement has probably proved the most economical.

Meanwhile, pending the settlement of the question as to what kind of tower stations should be adopted, Lieutenant Macdonald took the field on the 1st October 1834, and having taken extra precautions for the preservation of the two terminal stations observed at during the previous season—Ráepur (XIII) and Majhár (XIV)—proceeded by direction of the Surveyor General to select the stations in advance by the “ray trace” system, using small theodolites and perambulators. Much skill and judgment is necessary in carrying out this method, and some time was spent in acquiring the requisite accuracy; in short, a good deal of the work had to be revised. Moreover, progress was retarded by sickness, the services of the

principal Sub-Assistant Mr. James being lost through this cause for nearly three months of the field season. The principal station sites were finally selected across the Doáb as far as the Ganges, and the preliminary selection pushed on into the districts of Budaun and Moradabad beyond, before the party returned to recess quarters at Agra early in June.

No observing of principal angles was done this season, but the approximate series was completed for a distance of 100 miles, as far north as the Ganges, by 12 stations forming a single series of symmetrical triangles, and operations were in progress for a considerable distance beyond.

Lieutenant Macdonald himself was obliged by ill health to quit the field in April, and suffered so much from jungle fever during the ensuing recess that he applied to be relieved of his charge in September, and obtained sick leave. Unhappily he did not recover, but died before the end of the year. He was succeeded by Lieutenant E. L. Ommanney, of the Bengal Engineers, who had been appointed to the party in May to learn the practical duties of the Trigonometrical Survey, he having hitherto been employed on a survey of the Brahmaputra river. He joined the Budhon Series at Agra on the 13th June.

Mr. James was transferred to the Great Arc and his place not filled up until 1st March

4th Season 1835-36.

PERSONNEL.

Lieut. E. L. Ommanney, Bengal Engineers, 2nd Assistant.

Mr. J. H. Scully, 2nd Class Sub-Assistant.

1836, when Mr. J. Olliver, Chief Civil Assistant, joined, and the transfer of Mr. Scully also to the Great Arc towards the end of this season left the Series without any of its original staff. Lieutenant Ommanney took the field on

the 8th November 1835, and having received no sanction as yet for the erection of the towers, proceeded at once to run trial lines along the rays between the selected station sites, to ascertain that no serious obstacle existed in them which could not be readily removed, and he was engaged in this work until March 1836. But hitherto no rays were actually cleared owing to Lieutenant Ommanney's inexperience and to the refusal of the inhabitants to allow trees to be cut down.

The Government had recently (April 1835) considered the subject of ray clearing, and had directed that equitable compensation should be given in all cases of injury to the owners; and to enable a just valuation to be speedily made in the case of reculant proprietors, the civil authorities were ordered to direct the personal attendance of the *tahsildár* or *peshkár* (local subordinate Revenue Officers) at the spot, when called upon by the Survey Officers. At the same time the Survey Officers were enjoined to use every means to avoid bringing any highly prized or sacred tree in the ray passing from one station to another.

The latter part of this season was spent in clearing the rays between the stations in the plains, and in determining the height of the towers of observation which would inevitably be required to command them. Approximate angles were observed from the top of masts erected for the purpose, and before the close of the field season this work had been completed as far as Pondri (XXIV) in the middle of the Doáb.

In the case of the two first stations in the plain country—Gúrmi T.S. (XVII) and Bhind S. (XVIII)—the forts at these places offered suitable sites for stations, in the one case on a high bastion, and in the other on the gateway tower, on which during this season stations were built.

The final selection of stations forming a single series of symmetrical angles was extended as far as Moradabad in Lat. 29° , but this advanced part of the approximate series north of the Ganges was afterwards abandoned in favour of a double series of smaller triangles.

Several principal stations being now ready, Lieutenant Ommanney commenced the

5th Season 1836-37.

PERSONNEL.

Lieut. E. L. Ommanney, Bengal Engineers, 2nd Assistant.

Mr. J. Olliver, Chief Civil Assistant.

field season of 1836-37 by resuming the final observations which he completed at the undermentioned stations as follows:—at Jhánkri H.S. (XVI) 18th to 27th October 1836, at Majhár H.S. (XIV) 28th to 31st October, at Ráepur H.S. (XIII) 1st to 4th November, at Sánichri (XV) 5th to 8th November, at Gúrmi T.S. (XVII) 11th to 23rd November, and at Bhind S. (XVIII) by 2nd December.

By the time the observing party arrived at Gúrmi T.S. the next forward station on the west flank had been built on the gateway of Panáhat Fort, and the first tower station erected, that at Athgath, had been sufficiently prepared to be observed to.

Lieutenant Ommanney had intended to build solid, conical, mud towers, 22 feet in diameter at base, 15 feet at top, and about 40 feet high, at an estimated cost of from Rs. 200 to Rs. 300 each, but this plan did not meet the Surveyor General's approval; as, *firstly*, the lower centre, or station mark must be on the ground, so as not to be affected by dilapidation of the superstructure; and, *secondly*, the upper centre mark for the frequent adjustment of instrument and signals, must be always plumb over the lower centre, for which purpose the latter must be easily accessible both at first and for subsequent re-examination. Lieutenant Ommanney modified his towers accordingly, having a masonry core pierced with a vertical shaft or central opening 18 inches in diameter, and a horizontal arched passage of masonry at ground level giving light and access to the lower centre or station mark, with an easy spiral slope or ramp winding round the tower and leading to the summit.

The first tower erected, Athgath T.S. (XIX) on the banks of the Chambal, was only built in the first instance to a height of 26 feet, which appears to have been sufficient for the back rays, but afterwards (in 1840) it was rebuilt and raised 10 feet higher.

No further principal observations were taken this season, after those concluded at Bhind S. on the 2nd December, and the rest of the season was spent in building the towers and in taking approximate angles with the aid of masts and scaffolds, as far as the Ganges.

By the close of the season four towers Sherpur, Firozabad, Baragaon and Pondri, were reported as "well advanced" towards completion, and four others, Kilárnáo, Salímpur, Jamálpur and Sankráo, begun. But the earthwork of the Firozabad tower gave way and fell down twice, after it had been built up to a height of 28 feet.

By the end of the fourth season's work the following method of carrying on the principal triangulation in the plains, had been arrived at:—The country having been reconnoitred generally and no hills or artificial elevations suitable for stations met with, a ray trace, traverse or route survey was made in the desired direction for each new station, from which its precise bearing could be computed. A trial line was then run to ascertain that it contained no insurmountable obstacle, after which the line was cleared and the angles between adjacent lines measured by means of a small theodolite raised on the top of a high mast surrounded by a

x—J.

scaffold with a stage for the observer. This measurement was termed the "Approximate Series," a term which in more recent times has been applied to the laying out and preparation of the principal triangulation generally. After this it only remained to build the towers requisite for the final observations with a large theodolite.

The apparently small progress made may be attributed to the want of officers and assistants experienced in the work of triangulating in a plain country and of building high towers in mud without professional aid. But the prime cause of delay was the attempt to maintain almost as large triangles in the plains as in the hills, thus necessitating observations over distances much too great for distinct vision, except in very unusually clear weather.

Final observations were made at 6 principal stations, forming a quadrilateral figure and two single triangles, by which the Series was advanced a meridional distance of 32 miles and reached the south bank of the Chambal river, the boundary between the Gwalior State and the Agra District.

On 31st May 1837 Lieutenant Ommanney resigned his appointment in the Department, and left the Series in charge of Mr. Olliver, Chief Civil Assistant, the only officer remaining with the party.

Before resuming the field work for Season 1837-38, the Surveyor General directed

6th Season 1837-38.

PERSONNEL.

Mr. J. Olliver, Chief Civil Assistant.

„ J. Driberg, 3rd Class Sub-Assistant.

Mr. Olliver to reduce the size of the triangles in laying out the Series to the north of the Ganges, and in place of a single series of triangles having 15 to 20 mile sides, to adopt a double series of consecutive polygonal figures,

with sides from 8 to 15 miles in length, by which lower towers would suffice, greatly improved signals would be obtained, and some of the mounds which frequently obstructed the view on the longer rays might be utilized for station sites, whilst the double series would afford an effective check against error. Having regard however to the very backward state of the Series, none of the previous work which would serve, could be abandoned.

Mr. Olliver therefore, in great hopes of completing the section of the Series already laid out to the south of the Ganges, set to work to finish the 8 or 9 towers commenced under Lieutenant Ommanney the previous season. The more advanced of these—Athgath (XIX), Sherpur (XXI), Firozabad (XXII) and Pondri (XXIV)—still required much additional height which however their foundations were not calculated to bear with safety. Firozabad had already fallen twice from this cause. Mr. Olliver therefore pulled them down and rebuilt them afresh upon deeper and more solid foundations. In the case of Firozabad firm soil was only found at a depth of 16 feet below the surface. Having commenced work at all the towers at once to economize time, he was greatly impeded for want of funds; and was constrained to advance sums from his own private purse.

In his half-yearly report, dated 1st March 1838, he said that the progress hitherto had been rapid. The towers at Pondri (XXIV) and Baragaon (XXIII) were finished, Athgath (XIX) 25 feet high, and Kilármáo (XXV) 27 feet; but that Firozabad tower had fallen again after reaching a height of 40 feet.

This was the last of his (Mr. Olliver's) work here, for his services being urgently

required with the new party just formed for the Great Arc (Section 18° to 24°) under Lieutenant Waugh, B.E., he suddenly left on the 4th March, having made over charge to the Sub-Assistant, Mr. Driberg. Early next month (April 1838) and before he could have made much progress, Mr. Driberg was ordered to repair with the whole of the Budhon Series party to the Head Quarters of the Surveyor General at Dehra Dún.

During the following season, 1838-39, this party was employed under Lieutenant Renny on the southern section of the Great Arc, and the Budhon Series was thus left in abeyance.

On the 13th November 1839 Lieutenant Renny was put in charge of the Budhon

7th Season 1839-40.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant,
(*absent on other duty*).
Mr. C. Murphy, 1st Class Sub-Assistant.
„ W. Rossenrode, 2nd „ „
(*with Troughton and Simms' 18-inch Theodolite*
No. 2).

Series in the hope that his experience and ability would conduce to its more rapid progress and early completion. He was directed to re-organize an efficient party from the former Budhon Series party and from that of the Amua Series recently completed by Mr. Murphy, and to resume the operations where Lieutenant Ommanney had left off;

but as his personal assistance was required in the astronomical observations at Kaliána, Mr. Murphy was placed in temporary executive charge.

The work of the season consisted in completing the towers and extending the approximate series. The stations of Bhind (XVIII), Gúrmi (XVII), and the towers at Firozabad (XXII), Baragaon (XXIII) and Pondri (XXIV) were repaired, the last-built tower of Athgath (XIX) raised from 25 to 36 feet, and that of Kilármáo (XXV) from 19 to 44 feet, a new tower at Sherpur (XXI) built, and those at Salámpur (XXVI), Jamálpur (XXVII) and Sankráo (XXVIII) completed, leaving Parauli (XXXI) alone unfinished of all those south of the Ganges.

As soon as Mr. Murphy had set on foot the tower building he proceeded to take up the approximate series to the north of the Ganges as a double series of consecutive polygons with shorter sides, ordered by the Surveyor General in 1837-38, abandoning the sixty miles of approximate series ahead which had been carried as far as Moradabad (Lat. 29°). By March 1840 he had laid out the Sakrora hexagon.

Lieutenant Renny now (March 1840) visited the party and remained long enough to satisfy himself that the work was being carried on in a correct and systematic way.

By the end of this field season the Sakrora tower had been built, and the ground in advance for the next polygon reconnoitred. The towers built under Mr. Murphy north of the Ganges appear to have been solid, as first intended by Lieutenant Ommanney.

Lieutenant Renny being engaged in the astronomical observations at Kaliánpur and

8th Season 1840-41.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant,
(*absent on other duty*).
Mr. C. Murphy, 1st Class Sub-Assistant (*in*
executive charge).
„ O. Mulheran, 2nd „ „
„ W. Glynn, 3rd „ „

in the measurement of the Bider Base-line, Mr. Murphy remained in executive charge all this season. He began the season's work by selecting a second hexagon about the advanced station of Bánsgopál (XXXV), whilst the towers that had been damaged during the recent rainy season were being restored. One of them, Jamálpur (XXVII), had fallen, although the precaution had been taken of thatching the towers before the rains

set in. He then hastened southwards to resume the final observing which had been in abeyance four years since Lieutenant Ommanney finished at Bhind S. on the 2nd December 1836.

The final horizontal angles were now taken up and completed at the undermentioned stations as follows:—

at Firozabad T.S. (XXII)	between 7th and 9th November 1840
„ Panáhat S. (XX)	„ 10th „ 15th „ „
„ Athgath T.S. (XIX)	„ 16th „ 18th „ „
„ Sherpur „ (XXI)	„ 19th „ 20th „ „
„ Baragaon „ (XXIII)	„ 21st „ 30th „ „
„ Pondri „ (XXIV)	} in all December 1840
„ Kilármáo „ (XXV)	
„ Salímpur „ (XXVI)	} „ January, February, and to 8th March 1841.
„ Jamálpur „ (XXVII)	
„ Sankráo „ (XXVIII)	

The towers in advance were not sufficiently advanced for any further observations to be made; but before the end of the field season a third hexagon—that round Sirsa (XL)—was selected and marked by masonry pillars, up to the side Milik (XLIII)—Akbarpur (XLIV), the rays of the Sakrora and Bánsogpál polygons all cleared, and the angles approximately measured with a small theodolite.

No vertical angles were measured this season, and scarcely any secondary triangulation at all accomplished. The vertical angles were not measured, doubtless because the signals on these comparatively long rays in the plains were not visible at the time of least refraction, the only safe time for a single observer to measure them, and they were deferred until the year 1842-43 when a pair of observers with two good instruments became available for the simultaneous reciprocal measurement, requisite at any other time of day. The party returned to recess quarters at Dehra Dún on the 4th June 1841.

The approximate series having now been brought up from the south to within 50

9th Season 1841-42.
 PERSONNEL.
 Lieut. T. Renny, Bengal Engineers, 1st Assistant.
(absent on other duty).
 Mr. C. Murphy, 1st Class Sub-Assistant, *(in executive charge).*
 Mr. O. Mulheran, 2nd „ „
 „ W. Glynn, 3rd „ „

miles of the out-lying hills of the Sub-Himalayas about Hardwár (Haridwár), Mr. Murphy took the field in the middle of October 1841 at the north end, as being nearest to Dehra Dún, and proceeded to lay out the figures by which the junction with the Great Arc Series was to be effected.

Starting from the stations of Sheopuri T.S., Godhna T.S., and Chándípahár H.S., of the Great Arc, he selected Mahesari T.S., (now also belonging to the Great Arc) as the centre of a very irregular hexagonal figure, the north and north-east stations being on hills and one of them (Mábegarh) common to this and to the N.E. Longitudinal Series. Two more stations were then selected to form a pentagonal figure about Sarkára T.S. (XLV) by which the entire plan of the Series was completed about the end of February 1842. The rays

of these two polygons having been cleared at the same time, and the necessary tower stations built to the required height (16 to 20 feet), there remained only a few rays in the Sirsa hexagon to clear, and the towers to build or complete in the southern polygons before having all ready for the final measurement of the angles.

But it required the utmost exertions of all concerned to finish the towers by the beginning of July, when the party returned to recess quarters, having accomplished a very laborious season's work successfully.

10th Season 1842-43.

PERSONNEL.

Budhon Series Party (1). { Lieut. T. Renny, B.E., 1st Assistant.
Mr. C. Murphy, 1st Class Sub-Assistant.
" O. Mulheran, 2nd " "
" W. Glynn, 3rd " "

(1). Equipped with Troughton and Simms' 18-inch theodolite No. 2 and two 12-inch theodolites by Troughton and Simms for simultaneous reciprocal verticals.

Extra Party (2). { Mr. W. N. James, 1st Principal Sub-Assistant.
" N. Parsick, Sub-Assistant.
" T. Olliver, "

(2). With probably an 18-inch theodolite by Cary.

Extra Party (3). { Mr. G. Logan, 1st Assistant.
" G. Terry, Sub-Assistant.
" A. Olliver, "

(3). With 15-inch theodolite by Cary.

In view of the large amount of observing to be done, no astronomical observations for azimuth having yet been taken since the Series was begun, and no vertical angles observed since it entered the plains across the Chambal, (owing to want of visibility at time of minimum refraction), and to ensure its completion, the Surveyor General appointed two extra observing parties, and divided the work into three sections to be taken up simultaneously by the three parties as follows:—

In Lieutenant Renny's absence on military duty as Field Engineer to the Army of Reserve assembling at Ferozpur, Mr. Murphy with the main party was to complete the horizontal angles of the southern (Sakrora) polygon, and the unobserved triangle to the south of it, the whole of the verticals, and two Azimuths.

A third Azimuth was to be observed by one (or other) of the two extra parties.

Mr. James with two Sub-Assistants was to observe the horizontal angles of the next two polygons, the Bānsgopāl and Sirsa hexagons, measuring the vertical angles also in the afternoon whenever practicable.

Mr. Logan with two Sub-Assistants was to observe the angles of the two northernmost polygons, the Sarkāra pentagon and the Mahesari hexagon.

Accordingly Mr. Murphy took the field on the 15th October 1842 and reached Firozabad his first station for observation on the 11th November. Here in conjunction with his sub-assistants he measured three of the four vertical angles by simultaneous reciprocal observations, after which he proceeded to Panáhat and Gúrmī, where by the 10th December he had completed a set of azimuth observations (to ϵ Ursæ Minoris at both E. and W. elongations), besides the requisite vertical angles.

He then visited in succession the stations of Blind (XVIII), Sherpur (XXI), Baragaon

(XXIII), Pondri (XXIV), Kilármáo (XXV), Jamálpur (XXVII), and Sarsotha (XXIX), where by the 25th January 1843 he had completed the vertical angles on all but seven rays of the single portion of the Series to the south, and by the middle of February, the horizontal angles at Jamálpur (XXVII), Sarsotha (XXIX), Kariámái (XXXII), Sakrora (XXX), Mehtra (XXXIV), and Rajauli (XXXIII) of the Sakrora hexagon were also finished besides vertical observations on three rays of this figure. On the 10th February Lieutenant Renny rejoined and assumed charge at Sankráo T.S. (XXVIII), where he at once took up the final observing and by the 25th had completed the second Azimuth (using 29 *Camelopardalis* Hev. at both elongations), the necessary horizontal and the simultaneous reciprocal verticals.

Lieutenant Renny then completed the horizontal and vertical angles remaining to be observed in the following order:—at Parauli (XXXI) by the 4th March, Chandaupur (XXXVI) by the 14th, whilst Messrs. Murphy and Glynn with the two 12-inch theodolites co-operated in observing the simultaneous reciprocal verticals. The main party now returned to Kilármáo, Pondri, and Kariámái, completing or re-observing the angles which Mr. Murphy had been unable to obtain satisfactorily on his first visit, all which were made good by the 9th April. Having completed the work assigned to the main party on the southern section, Lieutenant Renny marched northwards re-observing or supplementing the observations which were still wanting to complete the Series.

A good half of the vertical angles were, practically speaking, simultaneous, *i.e.* taken at both ends of a ray within five minutes of one another, but some only within 15 minutes, whilst in a few cases the observations of the vertical angle at one end of a ray were taken at a widely different time from the corresponding observations at the other. The verticals had necessarily to be observed at any time of day when the signals were visible, with the natural result of giving great variations in the deduced co-efficient of refraction.

Meanwhile the two extra parties under Messrs. Logan and James leaving Head Quarters, Dehra Dún, on 2nd November reached Agra on the 26th, and having completed their equipment proceeded to the section of the field work allotted to them.

Mr. James reached his first station Rajauli (XXXIII) on the 23rd December 1842, and completed his two horizontal angles there on the 30th. The two next angles occupied him at Mehtra (XXXIV) from the 4th to the 21st January 1843. He next measured the six angles at Bámsgopál (XXXV) between the 24th January and 4th February, after which he proceeded to Sirsa (XL) where he was employed nearly a whole month, from 7th February till 3rd March, observing an azimuth and completing five of the six angles. He observed 29 *Camelopardalis* Hev. at both elongations, the same star that Lieutenant Renny was simultaneously observing at Sankráo. He next visited Bhatauli (XLII), near Moradabad town which he observed to, and whilst here his party was inspected by the Surveyor General. The four angles at Atora T.S. (XXXIX) occupied from the 14th to 26th March, and the two at Barauli (XXXVII) till after the middle of April. He then returned to Sirsa and was occupied from 20th April till the 3rd May in making good the angle which he had been unable to complete during his former long visit. The rest of the observing allotted to him having been completed by the other two parties, Mr. James helped to complete the vertical angles for a few days before returning to recess quarters.

Mr. Logan on the northern section of the work was rather more fortunate. He completed the angles at his first station Akbarpur (XLIV) by the 25th December 1842, then those at Nandi (XLVII), and three of the five angles at Sarkára (XLV) by the 10th January 1843; Harpálsid H. S. (XLVIII) was next observed at, and then Mahesari T.S., where however a portion of the angles had to be left unmeasured, by the 3rd of February. The Surveyor General visited and inspected the party whilst at Mahesari. The angles at Chándípahár near Hardwár, Godhna and Sheopuri, the stations of the Great Arc, were completed by the 16th February, after which the missing angles at Mahesari were observed, and all the four at Haldaur (XLVI), by 6th March. The missing angles at Sarkára (XLV) were next observed, and the party then proceeded to Milik (XLIII) where the measurement of the 4 angles occupied from the 12th to the 25th March, when the northernmost section allotted to Mr. Logan was finished, but Mr. James's work being backward, he continued his southward progress, completing the angles at Lút (XLI) and Kandarki (XXXVIII) by the end of the month.

Seeing Mr. James to be now in a fair way to complete the angles at the centre and east flank of the Series, and those on the west flank and to the southward being finished, Mr. Logan proceeded to co-operate with Lieutenant Renny in observing the remaining vertical angles all of which were completed by the middle of May, when all three parties marched to Head Quarters at Dehra Dún.

Three other angles were measured at the northern extremity of this season's work and in connection with the triangulation above described, by Captain J. S. Du'Vernet, when commencing the "North Connecting Series" afterwards named the North-East Longitudinal Series, in October and November 1842; but two of them were eventually superseded by re-measurements made by Lieutenant Renny eight years later, with superior instruments, which two are now incorporated with the North-East Longitudinal Series.

The calculations of the triangulation of this Series having been carried up from the side of origin, Budhon-Tinsmál of the Calcutta Longitudinal Series, to the terminal side, Sheopuri-Mahesari of the Great Arc, the following discrepancies were met with between the original values of the length and azimuth of the terminal side above named and those of the latitude and longitude of the terminal station Mahesari, and the values of the same as derived from the Great Arc after the reduction of the North-West Quadrilateral.

In Logarithm of the side	+ 0.000,0302,6 = 4.5 inches per mile nearly.
„ Latitude	+ 1".002
„ Longitude	+ 0.307
„ Azimuth	+ 8.284

These discrepancies were treated as errors in the Budhon Series and were dispersed by the method of least squares, as described in Part I of Volume VII of the *Account of the Operations*, &c.

Soon afterwards, the two principal stations at Ráepur of this Series and the Great Arc which are only about 41 feet apart, (see page vii—J. above), were connected in the manner described at page 73—J. of Vol. VII quoted above.

The following discrepancies between the first corrected Budhon Series values, and the adopted values of the Great Arc were then met with at Ráepur H.S. (XIII) belonging to the Budhon Series :—

In Latitude	+ 0".10
„ Longitude	— 0'.02

These discrepancies were treated as errors in the first corrected results of the Budhon Series, and they were dispersed over the whole triangulation by introducing two additional equations of condition for satisfaction, the four primary equations which were required to dispose of the terminal errors being simultaneously maintained. For full description of the procedure see Part I of Vol. VII of the *Account of the Operations, &c.*

The trigonometrical heights above sea-level were checked at several stations (see page 63—J.) by the spirit leveling operations of the Trigonometrical and Revenue Surveys, and the errors thus disclosed, together with those of the terminal side Sheopuri-Mahesari, dispersed over the Series in four sections indicated at pages 37 and 38 of Part I of the above named volume.

In the section Budhon-Tinsmál to Firozabad-Baragaon, a distance of about 212 miles, the cumulative error was + 12 feet nearly. In the next section ending at Mehtra-Bánsopál, a distance of about 88 miles, it was as much as — 17 feet. In the next section ending at Bhatauli-Sirsa-Milik, a distance of about 34 miles, it was less than 1 foot; and in the last section, a distance of about 50 miles, it was nearly — 7 feet. For further details see pages 37 and 38 quoted above.

Secondary Triangulation.

As long as the Series lay in hilly country under Lieutenant Macdonald, the number of secondary stations, landmarks, and places of importance or interest fixed, was very considerable, including the towns of Tehri, Orchha, Jhánsi, Datia, Narwar, Gwalior, Barwa Sagar, and many hill forts, temples &c.

But after entering the plains in lat. 26° 30' where no view was to be had except by clearing the rays of trees and building high towers, scarcely any secondary points could be fixed without making special arrangements, and the whole strength of the establishment was barely sufficient for the principal triangulation until its close. Nevertheless, Shikohabad, Jalesar, Moradabad, Bijnor, and Kankhal were fixed.

Compiled from the very extensive and complete materials collected by Mr. Charles Wood.

May 1881.

B. R. BRANFILL.

BUDHON MERIDIONAL SERIES.

ALPHABETICAL LIST OF PRINCIPAL STATIONS.

Akbarpur	XLIV.	Kilármáo	XXV.
Algi	VIII.	Lút	XLI.
Andhiári	IV.	Mábegarh	I.
Athgath	XIX.	(of North-East Longitudinal Series).	
Atora	XXXIX.	Maharájpur	X.
Bánsopál	XXXV.	Mahesari	LII.
Baragaon	XXIII.	(of Great Arc Meridional Series).	
Barauli	XXXVII.	Majhlár	XIV.
Bhatauli	XLII.	Mehtra	XXXIV.
Bhind	XVIII.	Milik	XLIII.
Blitári	VII.	Nandi	XLVII.
Budhon	III.	Narwar	XI.
(of Calcutta Longitudinal Series).		Panáhat	XX.
Chandanpur	XXXVI.	Parauli	XXXI.
Dargawa	II.	Patna	I.
Daryapur	IX.	Pondri	XXIV.
Dhandkúa	III.	Ráepur	XIII.
Firozabad	XXII.	Rajauli	XXXIII.
Gúrmi	XVII.	Sakrora	XXX.
Gwáli	V.	Salámpur	XXVI.
Haldaur	XLVI.	Sánichri	XV.
Harpálsid	XLVIII.	Sankráo	XXVIII.
Jamálpur	XXVII.	Sarkára	XLV.
Jhánkri	XVI.	Sarsotha	XXIX.
Kandarki	XXXVIII.	Sheopuri	XLVIII.
Karaia	XII.	(of Great Arc Meridional Series).	
Kariámái	XXXII.	Sherpur	XXI.
Kathera	VI.	Sirsa	XL.
		Tinsmál	VII.
		(of Calcutta Longitudinal Series).	

BUDHON MERIDIONAL SERIES.

NUMERICAL LIST OF PRINCIPAL STATIONS.

III	.	.	.	Budhon.	XXVI	.	.	.	.	Salimpur.
	.	.	.	(of Calcutta Longitudinal Series).		.	.	.	.
VII	.	.	.	Tinsmál.	XXVII	.	.	.	.	Jamálpur.
	.	.	.	(of Calcutta Longitudinal Series).		.	.	.	.
I	.	.	.	Patna.	XXVIII	.	.	.	.	Sankrá.
II	.	.	.	Dargawa.	XXIX	.	.	.	.	Sarsotha.
III	.	.	.	Dhandkúa.	XXX	.	.	.	.	Sakora.
IV	.	.	.	Andhiári.	XXXI	.	.	.	.	Parauli.
V	.	.	.	Gwáli.	XXXII	.	.	.	.	Kariámál.
VI	.	.	.	Kathera.	XXXIII	.	.	.	.	Rajauli.
VII	.	.	.	Bhitári.	XXXIV	.	.	.	.	Mehtra.
VIII	.	.	.	Algi.	XXXV	.	.	.	.	Bánsogól.
IX	.	.	.	Daryapur.	XXXVI	.	.	.	.	Chandanpur.
X	.	.	.	Maharájpur.	XXXVII	.	.	.	.	Barauli.
XI	.	.	.	Narwar.	XXXVIII	.	.	.	.	Kandarki.
XII	.	.	.	Karaia.	XXXIX	.	.	.	.	Atora.
XIII	.	.	.	Ráepur.	XL	.	.	.	.	Sirsa.
XIV	.	.	.	Majhár.	XLI	.	.	.	.	Lát.
XV	.	.	.	Sánichri.	XLII	.	.	.	.	Bhatauli.
XVI	.	.	.	Jhánkri.	XLIII	.	.	.	.	Milik.
XVII	.	.	.	Gúrmi.	XLIV	.	.	.	.	Akbarpur.
XVIII	.	.	.	Bhind.	XLV	.	.	.	.	Sarkára.
XIX	.	.	.	Athgath.	XLVI	.	.	.	.	Haldaur.
XX	.	.	.	Panáhat.	XLVII	.	.	.	.	Nandi.
XXI	.	.	.	Sherpur.	XLVIII	.	.	.	.	Harpálsid.
XXII	.	.	.	Firozabad.	I	.	.	.	.	Mábegarh.
XXIII	.	.	.	Baragaon.	XLVIII	.	.	.	.	(of North-East Longitudinal Series).
XXIV	.	.	.	Pondri.		.	.	.	.	Sheopuri.
XXV	.	.	.	Kilármáo.	LII	.	.	.	.	(of Great Arc Meridional Series).
	.	.	.			.	.	.	.	Mahesari.
	.	.	.			.	.	.	.	(of Great Arc Meridional Series).

BUDHON MERIDIONAL SERIES.

DESCRIPTION OF PRINCIPAL STATIONS.



Of the 48 Principal Stations composing this Series, the first 16 are on hills occupying the southern half of its extent. They are low solid platforms, either level with the rock, marked in such case *in situ*, or raised above it. Where the platform is thus raised there is (presumably) a rock-mark or stone, above which one or more mark-stones, with the usual engraved circle and dot, are inserted in the platform, the uppermost even with its surface. When the Series entered the plains, artificial elevations had to be constructed; the necessity for constructing these was sometimes avoided, either in part or entirely, by taking advantage of existing buildings and bastions of forts with which the country abounded. The special erections consisted at first, generally speaking, of *kacha* towers, 20 to 30 feet square at base, having about 7 feet square in the interior made of *paka* brick laid in mud cement, with a central hollow about 1½ feet in diameter running vertically through it, and a mark-stone laid in masonry at about the level of the ground: an arched doorway and passage led to the mark-stone for convenience in plumbing; and a staircase exterior to the tower gave access to the top. Subsequently, the *paka* pillar instead of being perforated was made solid, of about 42 inches diameter at top and having one or more mark-stones built vertically within it: in certain instances no definite information is forthcoming as to the number of marks which were built into the pillar; in these cases no allusion is made in the descriptions to any mark save that at the summit.

The following descriptions have been compiled from those given in the original MS. General Report and other original records of this Series, supplemented in respect to the neighboring villages, by information obtained from the Revenue Survey, Topographical Survey, and other reliable maps of the country traversed. The orthography is in literal agreement with the Gazetted List for the N.W. Provinces, wherever the locality is identified; and conforms to the spirit of the orders of Government on the subject, as worked out in this and other provincial lists, where there is no clear literal authority. The information as to the local sub-divisions in which the several stations occur has been derived where practicable from the Annual Reports received from the civil authorities to whose charge the stations have been committed.

III.—(*Of the Calcutta Longitudinal Series*). Budhon Hill Station, lat. 24° 5', long. 78° 34'—observed at in 1826, 1833 and 1864—is situated immediately above the village of that name: thána Barodia, tahsil Kurai, pargana Banda, district Saugor.

The pillar is solid and contains three marks, the two upper respectively 9' and 4 feet above the lowest. The station of 1826 was re-visited in 1833 for the purpose of originating the Budhon Meridional Series, but no alteration in its construction appears to have been made. When again visited in 1864 the mark-stones were found untampered with, the upper being accurately plumbed over the lower, which was adopted for the new station. The bearings and distances of surrounding villages are:—Jáman Kheri 1·5 miles N.W.; Burruho 1·5 miles N; Dubri 1·3 miles E.N.E.; Khirea 1·1 miles E.S.E.; and Kanera 2 miles due S.

VII.—(*Of the Calcutta Longitudinal Series*). Tinsmál Hill Station, lat. $24^{\circ} 7'$, long. $79^{\circ} 2'$ —observed at in 1826, 1833, 1834 and 1864—is situated on the top of a very conspicuous hill about three quarters of a mile S. by E. of the village of Tinsua from which it is approached: thána, tahsíl and pargana Banda, district Saugor.

The pillar is solid and has three marks, one engraved on the rock *in situ* and the others 3.5 and 8.5 feet above it respectively. The station of 1826 was re-visited in 1833 for the purpose of originating the Budhon Meridional Series, when its height was increased by 8.5 feet. It was again visited in 1834 to originate the Rangir Meridional Series, but no further alteration in its construction appears to have been made. On visiting it in 1864 the upper mark was found displaced and the position of the lower was adopted for the new station. The bearings and distances of other surrounding villages are:—Dalpatpur, from which a road leads up to the station, 1.5 miles N.E.; Lamnau 1.3 miles towards the W.; and the deserted village of Tinsi 0.8 mile S.S.E.

I. Patna Hill Station, lat. $24^{\circ} 20'$, long. $78^{\circ} 40'$ —observed at in 1833—is situated on a sandstone hill, standing on an elevated plateau, on the N. E. face of which is the large village of Patna distant half a mile from the station: tahsíl Mahroni, pargana Máraura Nárlhat, district Lalitpur.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of other surrounding villages are:—Dongraa Kalán 2.2 miles N. by W.; Chanaura 2.2 miles N.E. by N.; and Baraudia 2.4 miles due E.

II. Dargawa Hill Station, lat. $24^{\circ} 37'$, long. $79^{\circ} 4'$ —observed at in 1833—is situated on a steep rocky ridge, running nearly north and south, at the northern foot of which is the village of Dargawa distant 0.4 mile from the station: pargana Baldeogarh of the Orchha or Tehri state.

The station is marked on the rock *in situ*. The bearings and distances of other surrounding villages are:—Parra 0.3 mile N.W.; Rasoi 1 mile N.N.W.; Bhadaura 1.4 miles S.S.W.; and Magarkhera 1.6 miles E.S.E.

III. Dhandkúa Hill Station, lat. $24^{\circ} 48'$, long. $78^{\circ} 46'$ —observed at in 1833 and 1834—is situated on a detached hill, which is deemed sacred by the inhabitants of those parts, and at the northern foot of which at a distance of 500 feet is the village of Dhandkúa: tahsíl Mahroni, pargana Bánpur, district Lalitpur.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of other surrounding villages are:—Pura 0.8 mile N.W. by N.; Billahta 0.8 mile S.S.W.; and Khakhron 2.3 miles S.E. by E.

IV. Andhiári Hill Station, lat. $24^{\circ} 41'$, long. $78^{\circ} 16'$ —observed at in 1833—is situated on the highest point of the sandstone range of that name, and about 100 yards north of a remarkable cave: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Sirsod 0.4 mile N. by W.; Jamursa 2.1 miles S.E.; and Larheri 2 miles S.W.

V. Gwáli Hill Station, lat. $25^{\circ} 10'$, long. $78^{\circ} 28'$ —observed at in 1833—is situated on a rocky ridge running north and south, and takes its name from a small village which is distant about $\frac{1}{3}$ of a mile to the E.: pargana Jhánsi, district Jhánsi.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Bijpur 1.2 miles N.E.; Lakhanpur 1.3 miles S.E. by S.; and Busai 1.6 miles S.W. by S.

VI. Kathera Hill Station, lat. $25^{\circ} 14'$, long. $79^{\circ} 0'$ —observed at in 1834—is situated on a high and steep hill which was formerly used as a stronghold: pargana Mau, district Jhánsi.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Laraun 1 mile S.W.; Kathera Muáf 1.6 miles W.; and Hanspura 0.4 mile E. by N.

VII. Bhitári Hill Station, lat. $25^{\circ} 28'$, long. $78^{\circ} 47'$ —observed at in 1834—is situated on a hill on the E. bank of the Betwa river, and distant 0.4 mile S.S.W. of the village after which it is named. The high road from Jhánsi to Garotha passes about a mile north of the station: in the Orchha or Tehri state.

The station is marked on a large block of quartz around which a platform has been built. The bearings and distances of neighboring villages are:—Tilatha 1.1 miles S. by W.; Bagat, on the left bank of the Dangrai Nadi, 2.8 miles E. by S.

VIII. Algi Hill Station, lat. $25^{\circ} 30'$, long. $78^{\circ} 24'$ —observed at in 1834—is situated on a hill about 3 miles north of the hill fort and large village of Dinara: in the Gwalior state.

The station is marked on the rock *in situ* around which a platform has been built. The bearings and distances of surrounding villages are:—Khirk 1.2 miles N.N.W.; Algi 1.1 miles S.W.; and Guraira Ráj Orchha 0.5 mile due S.

IX. Daryapur Hill Station, lat. $25^{\circ} 42'$, long. $78^{\circ} 41'$ —observed at in 1834—is built on the site of a dilapidated fort surmounting a low isolated hill, on the southern brow of which is the village of Daryapur: tahsíl and pargana Datiya of the Datiya state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Bhúla 0.9 mile S.; Dúrsara 1.3 miles N.E.; and Karkhara 1.6 miles N.N.W.

X. Maharájpur Hill Station, lat. $25^{\circ} 54'$, long. $78^{\circ} 17'$ —observed at in 1834—is situated on a hill rising immediately above the village of Maharájpur and surrounded by several lower hills: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Rajare and Lailapura 0.8 mile towards the W. by S.; Kanwai 1.5 miles N.N.E.; and Chetauni 1.8 miles S.E. by S.

XI. Narwar Hill Station, lat. $25^{\circ} 37'$, long. $77^{\circ} 58'$ —observed at in 1834—is situated on the N.E. extremity of a sandstone hill on which, at a few feet to the E.S.E., the secondary station Ladára h.s. (of the Great Arc Meridional Series, Section 24° to 30°) is built: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding places are:—the large town and fort of Narwar about $1\frac{1}{2}$ miles N.W. by N.; Surkharia village 1.3 miles N.E.; and Shergarh 1.5 miles S. by E.

XII. Karaia Hill Station, lat. $25^{\circ} 54'$, long. $78^{\circ} 3'$ —observed at in 1834—is situated in the centre of an unfinished fort which occupies an eminence of the great sandstone range extending to the vicinity of Gwalior: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Karaia 0.5 mile E.S.E.; Rethaunda 2 miles S. by W.; and Dhobai 1.8 miles N. by E.

NOTE.—*This station is almost certainly identical with the secondary point Karaia h.s. of the Great Arc Meridional Series, Section 24° to 30° , in the original records of which however it is described as on the W. turret of a well known detached fortified hill on road Gwalior to Sironj; Karaia village lies on the eastern slope: it is marked by a circular platform with a mark-stone, having a ☉ engraved on it.*

XIII. Rácpur Hill Station, lat. $26^{\circ} 8'$, long. $78^{\circ} 7'$ —observed at in 1834 and 1836—is situated on a lofty conical peak of the Vindhyaehal range surmounted by a Hindu temple, on the western side of which Rácpur H.S. of the Great Arc Meridional Series, Section 24° to 30° , is built. The station commands a good view of the town and fort of Gwalior which lie about $9\frac{1}{2}$ miles to the N.E.: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of neighboring villages are:—Rácpur $1\frac{1}{2}$ miles W.S.W.; and Naigaon 1.5 miles S.

XIV. Majhár Hill Station, lat. $26^{\circ} 6'$, long. $78^{\circ} 31'$ —observed at in 1834 and 1836—is situated on the same elevated plateau as Gujara fort from which it is distant about $1\frac{1}{2}$ miles due north: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of neighboring places are:—Jamrúha fort 2 miles E.N.E.; and Naigamo village 3.1 miles E.S.E.

XV. Sáníchri Hill Station, lat. $26^{\circ} 24'$, long. $78^{\circ} 15'$ —observed at in 1836—is built adjoining some ruins on a sacred hill which is the residence of a *guru* or religious instructor of the Raja, and stands above the ruins of the ancient town of Ainti: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding places are:—Khitore fort 2 miles E. by N.; Burrúli village 1.4 miles N.N.W.; and Parbat village 0.6 mile W.S.W.

XVI. Jhánkri Hill Station, lat. $26^{\circ} 19'$, long. $78^{\circ} 35'$ —observed at in 1836—is situated on a low range of hills which runs nearly north and south, and has a couple of hamlets lying at the foot of the hill on the eastern side: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Silauli 1.3 miles N.E. by E.; Makata 1.1 miles S.E.; and Chimara 1.9 miles W.S.W.

XVII. Gúrmi Tower Station, lat. $26^{\circ} 36'$, long. $78^{\circ} 33'$ —observed at in 1836 and 1842—is situated

on a bastion at the northern angle of the mud fort attached to the village of Gúrmi which lies between the Sáníchri hills and the Chambal river: in the Gwalior state.

The station consists of a tower of sun-dried bricks and mud cement, raised to a height of 27 feet above the terreplein of the rampart, and having a mark-stone at top and another at bottom. The bearings and distances of surrounding villages are:—Silauli 1·6 miles N.W. by W.; Kaliánpura 1·6 miles S.W. by W.; and Gopálpura 1·4 miles E. by S.

XVIII. Bhind Station, lat. $26^{\circ} 34'$, long. $78^{\circ} 50'$ —observed at in 1836 and 1842—is situated on the roof of the gateway in the north face of the masonry fort attached to the large village of Bhind which lies on the plain south of the Chambal river. The station is 34 feet above the level of the interior of the fort: in the Gwalior state.

The station consists of a masonry pillar, 5 feet high and 9 feet square, which carries the usual mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Pura 0·4 mile N. by E.; Khirpura 1·3 miles S. S. W.; Haibatpura 1·8 miles W.; and Kumaroa 1·7 miles N.W. by W.

XIX. Athgath Tower Station, lat. $26^{\circ} 48'$, long. $78^{\circ} 45'$ —observed at in 1840 and 1842—is situated amidst the ravines on the north bank of the Chambal river, and close to the northern skirts of the village of Athgath or Hathkanth: tahsíl Panáhat, pargana Hathkanth, district Agra.

The station consists of a tower, 36 feet high and 14 feet square at top, having a central hollow core of masonry: it has a mark-stone at level of ground floor. The bearings and distances of surrounding villages are:—Kiári 1·3 miles W. by S.; Piárapura 1·1 miles N.E.; and Surekhipura 1·3 miles N.E. by E.

XX. Panáhat Station, lat. $26^{\circ} 53'$, long. $78^{\circ} 25'$ —observed at in 1840 and 1842—is situated on the roof of a vaulted building (apparently an interior gateway) of the dilapidated masonry fort at the south side of the village of Panáhat: tahsíl and pargana Panáhat, district Agra.

The station mark is elevated 30 feet above the ground at the south side of the building, the walls of which were raised to form a platform around a pillar 3 feet high. The bearings and distances of surrounding villages are:—Biprauli 1·4 miles W.N.W.; Utana 1·1 miles S.S.E.; and Sikthura 2·5 miles E.

XXI. Sherpur Tower Station, lat. $27^{\circ} 1'$, long. $78^{\circ} 42'$ —observed at in 1840 and 1842—is situated on the terreplein of the rampart at the northern corner of an old mud fort standing a short distance east of the village of Sherpur: thána Sarsaganj, tahsíl and pargana Shikohabad, district Mainpuri.

The station consists of a tower of sun-dried bricks and mud cement, 30·8 feet high and 14 feet in diameter at top, having a central hollow core of burnt brick: it has a mark-stone at level of ground floor. The bearings and distances of surrounding villages are:—Madanpur 1 mile N.N.W.; Pandrawan 0·3 mile S. by E.; and Aidálpur 0·3 mile N.E.

XXII. Firozabad Tower Station, lat. $27^{\circ} 9'$, long. $78^{\circ} 26'$ —observed at in 1840, 1842 and 1843—is situated on the terreplein of the rampart at the S. E. corner of an old mud fort standing about $\frac{1}{4}$ mile W. of the town of Firozabad: pargana and tahsíl Firozabad, district Agra.

The station consists of a tower of sun-dried bricks and mud cement, 43·8 feet high and 14 feet square at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the level of the terreplein. The bearings and distances of surrounding places are:—Firozabad station, of the E. I. Railway, 0·3 mile S.S.E.; Rasúlpur village 1·1 miles E.S.E.; Datauji 1·1 miles W.S.W.; and Humáyúnpur 1·2 miles N.W.

XXIII. Baragaon Tower Station, lat. $27^{\circ} 15'$, long. $78^{\circ} 45'$ —observed at in 1840, 1842 and 1843—is situated on the crest of a mound distant $\frac{1}{4}$ mile to the S. E. of the village of Baragaon: thána Jasrána, tahsíl and pargana Mustafabad, district Mainpuri.

The station consists of a tower of sun-dried bricks and mud cement, 45·4 feet high and 14 feet square at top, having a central core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The Etáwáh Branch of the Ganges Canal runs at $\frac{1}{4}$ mile S.W. of the station; and the bearings and distances of surrounding villages are:—Nahu 1·1 miles N.; Jasrána 2·8 miles S.S.W.; Kuári 2·2 miles S.E.; and Kanehgahi 2·6 miles N.E.

XXIV. Pondri Tower Station, lat. $27^{\circ} 28'$, long. $78^{\circ} 27'$ —observed at in 1840 and 1843—is situated on a mound (about 25 feet in height) within the ruins of the mud fort attached to the small village of Pondri: tahsíl and pargana Jalesar, district Agra.

The station consists of a tower of sun-dried bricks and mud cement, 44·3 feet high and 13 feet square at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding villages are:—Punhara 1·5 miles W. by N.; Kasua 1·3 miles N.; Khaira Taj 1·2 miles E. by N.; and Mahaki 1·8 miles S.S.W.

XXV. Kilármáo Tower Station, lat. $27^{\circ} 33'$, long. $78^{\circ} 49'$ —observed at in 1840, 1842 and 1843—is situated on the crest of a mound (about 20 feet in height) distant $\frac{1}{2}$ mile west of the small village of Kilármáo: thána, tahsíl, pargana and district Etah.

The station consists of a tower of sun-dried bricks and mud cement, 44.5 feet high and 14 feet square at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding places are:—Etah town 6 miles W.; Nehchalpur village 0.9 mile W.N.W.; Jísukhpur 0.5 mile S.W.; and Marjadpur 0.6 mile N. by W.

XXVI. Salímpur Tower Station, lat. $27^{\circ} 47'$, long. $78^{\circ} 33'$ —observed at in 1841 and 1843—is situated on the crest of a mound (about 20 feet in height) distant 600 yards west of the small village of Salímpur: thána and tahsíl Kásganj, pargana Bilráam, district Etah.

The station consists of a tower of sun-dried bricks and mud cement, 48 feet high and 13 feet square at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding villages are:—Badampur 0.9 mile E.S.E.; Narámpur 0.5 mile S.; Kutubpur 1.2 miles N.W.; and Dharampur 1.3 miles N.E. by N.

XXVII. Jamálpur Tower Station, lat. $27^{\circ} 48'$, long. $78^{\circ} 52'$ —observed at in 1841 and 1843—is situated on a mound (about 12 feet in height) within the ruins of a mud fort distant nearly half-a-mile to the N.W. of the small village of Jamálpur: thána Saháwar, tahsíl Kásganj, pargana Saháwar, district Etah.

The station consists of a tower of sun-dried bricks and mud cement, 28 feet high and 14 feet in diameter at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding villages are:—Firozpur 0.5 mile S.S.W.; Chadpur 0.5 mile N.W.; and Bhaloli 0.7 mile N.E.

XXVIII. Sankráo Tower Station, lat. $28^{\circ} 2'$, long. $78^{\circ} 35'$ —observed at in 1841 and 1843—is situated on the site of an old fort on a high spur of the bank which bounds the southern edge of the *khádar* or low lands of the Ganges, and stands close to the west side of the village of Sankráo which is distant within half-a-mile to the south of the old bed of that river: tahsíl Atrauli, pargana Gangíri, district Aligarh.

The station consists of a tower of burnt bricks and mud cement, 37.3 feet high and 14 feet in diameter at top, having a central hollow core of masonry: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding villages are:—Rustamnala 1.1 miles W. by N.; Mohkampur 1.2 miles S.S.E.; and Síkri 1.1 miles E. by S.

XXIX. Sarsotha Tower Station, lat. $28^{\circ} 6'$, long. $78^{\circ} 48'$ —observed at in 1843—is situated on the northern edge of the *khádar* or low lands of the Ganges, and stands about half-a-mile N.E. of the hamlet of Sarsotha a place of Hindu pilgrimage: thána, tahsíl and pargana Sahaswán, district Budaun.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 23.8 feet high: it has a mark-stone in the foundation, another at 7 feet above ground level, and a third at summit. The bearings and distances of surrounding villages are:—Manikpur 1 mile S.W.; Alipur 0.6 mile N.W.; and Gulhaur 2.3 miles N.E. by E.

XXX. Sakrora Tower Station, lat. $28^{\circ} 13'$, long. $78^{\circ} 36'$ —observed at in 1843—is situated on a mound (about 10 feet in height) within half-a-mile S. by W. of the village of Sakrora: thána Asadpur, tahsíl Gunnaur, pargana Asadpur, district Budaun.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 21 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Lahra 0.5 mile W.N.W.; Mirzapur 0.6 mile S.; and Baudrái 1.3 miles N.E. by E.

XXXI. Parauli Tower Station, lat. $28^{\circ} 10'$, long. $78^{\circ} 24'$ —observed at in 1843—is situated on high ground about 350 yards due north of the village of Parauli or Parhauri: thána Ramghat, tahsíl Anúpsahr, pargana Dibai, district Bulandshahr.

The station consists of a tower of unburnt bricks and mud cement, 15 feet in diameter at top, enclosing a central solid pillar of masonry 18.8 feet high: it has a mark-stone at ground level, another at 7 feet above it, and a third at summit. The bearings and distances of surrounding villages are:—Rampur 0.7 mile E.; Bajhera 0.6 mile S.E.; Jirajpur Khurd 1.2 miles W.; and Belon Nagla 0.9 mile N.

XXXII. Kariámái Tower Station, lat. $28^{\circ} 15'$, long. $78^{\circ} 48'$ —observed at in 1843—is situated on a slight elevation distant half-a-mile east of the village of Kariámái: thána Islámnagar, tahsíl Bisauli, pargana Islámnagar, district Budaun.

The station consists of a tower of unburnt bricks and mud cement, 15 feet in diameter at top, enclosing a central solid pillar of masonry 17.3 feet high: it has a mark-stone at ground level, and another at summit. The bearings and distances of surrounding villages are:—Bhartpur 0.4 mile S.S.E.; Udaipur 0.8 mile N.E.; and Firozpur 1.1 miles due N.

XXXIII. Rajauli Tower Station, lat. $28^{\circ} 22'$, long. $78^{\circ} 28'$ —observed at in 1843—is situated on the *khadar* or low lands of the Ganges, and stands 0.4 mile S.E. of the village of Rajauli or Rajawali: thána Rajpura, tahsíl Gunnaur, pargana Rajpura, district Budaun.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 23 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Paniwara 1.3 miles S.W.; Neora 1.3 miles S. by E.; and Gobindpur 1.1 miles due E.

XXXIV. Mehtra Tower Station, lat. $28^{\circ} 22'$, long. $78^{\circ} 41'$ —observed at in 1843—is situated on a mound (about 10 feet in height) distant $\frac{1}{2}$ mile north of the small village of Mehtra: tahsíl and pargana Sambhal, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 16 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Bahpur Patti 1.1 miles E.; Sultánpur 2.4 miles W.; Mirzapur 0.9 mile N.N.E.; and Yazafpur 0.8 mile N.W. by N.

XXXV. Bámsgopál Tower Station, lat. $28^{\circ} 33'$, long. $78^{\circ} 34'$ —observed at in 1843—is situated on a sandy mound (7 or 8 feet in height) distant 500 yards west of the temple of Bámsgopál a place of Hindu pilgrimage: tahsíl and pargana Sambhal, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 18.8 feet high: it has a mark-stone at a little below ground level, and another at summit. The bearings and distances of surrounding places are:—Sambhal town 3 miles N.E.; Turrano Sarai 1.8 miles E. by S.; Gandhipura village 1 mile N. by E.; Busla village 1.7 miles W. by S.; and Bahádurpur Sarai 1.1 miles S.W. by S.

XXXVI. Chandanpur Tower Station, lat. $28^{\circ} 34'$, long. $78^{\circ} 21'$ —observed at in 1843—is situated at the distance of half-a-mile to the E.S.E. of the village of Chandanpur: tahsíl and pargana Hasanpur, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 16.5 feet high: it has a mark-stone at ground level, another 7 feet above it, and a third at summit. The bearings and distances of surrounding villages are:—Deorara 0.8 mile S.; Khanraua 1.8 miles W.S.W.; and Chhapna 2.1 miles N.W. by N.

XXXVII. Barauli Tower Station, lat. $28^{\circ} 32'$, long. $78^{\circ} 48'$ —observed at in 1843—is situated on a mound (about 20 feet in height) which is apparently the site of a deserted village, and is distant nearly $1\frac{1}{2}$ miles N. E. of the village of Barauli: tahsíl and pargana Bilári, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 16.5 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Khásepur 0.6 mile W.; Pípli 0.8 mile N.E.; and Akrauli Auliapur 1.1 miles E.S.E.

XXXVIII. Kandarki Tower Station, lat. $28^{\circ} 44'$, long. $78^{\circ} 27'$ —observed at in 1843—is situated close to the eastern side of the village of Kandarki: tahsíl and pargana Hasanpur, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 18.7 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Khairpur 1.1 miles E.S.E.; Begpur 1 mile S.W. by W.; and Jehul 1 mile W.N.W.

XXXIX. Aтора Tower Station, lat. $28^{\circ} 43'$, long. $78^{\circ} 40'$ —observed at in 1843—is situated on a mound (about 30 feet in height) immediately N. W. of the village of Aтора or Athaura on the high road from Moradabad to Sambhal and Aligarh: tahsíl and pargana Sambhal, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 17.8 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Athauri 0.4 mile S.; Bháuddínpur 0.8 mile W.; Harthali 1.3 miles N.W.; and Sháhpur 1.6 miles E.N.E.

XL. Sirsa Tower Station, lat. $28^{\circ} 55'$, long. $78^{\circ} 35'$ —observed at in 1843—is situated on a mound (about 15 feet in height) distant 600 yards north of the village of Sirsa: tahsíl and pargana Amroha, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 26 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Daryapur 0.7 mile S.W. by W.; Manye Chak 0.4 mile N.E. by N.; Raghunáthpur 1 mile S.E. by S.; and Háshampur 0.9 mile N.W.

XLI. Lút Tower Station, lat. $28^{\circ} 54'$, long. $78^{\circ} 21'$ —observed at in 1843—is situated in the lands of the village of Lút: tahsíl and pargana Hasanpur, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 20 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Mahamdi 0.1 mile N.N.W.; Afzalpur 0.6 mile S. by E.; Kurala 0.6 mile N.E.; and Lakhania 1.2 miles S.W.

XLII. Bhatauli Tower Station, lat. $28^{\circ} 54'$, long. $78^{\circ} 46'$ —observed at in 1843—is situated at the distance of about 1 mile west of the village of Bhatauli: tahsíl, pargana and district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 14.5 feet high: it has a mark-stone at summit. The bearings and distances of surrounding places are:—Moghalpur town 1.6 miles N.; Mahtakpur 1.2 miles W.S.W.; and Gopálpur 1.9 miles W. by N.

XLIII. Milik Tower Station, lat. $29^{\circ} 5'$, long. $78^{\circ} 28'$ —observed at in 1843—is situated in the lands of the village of Lodhipur Milik: tahsíl Chánpur, pargana Burhpur or Nurpur, district Bijnor.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 17.3 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Sahela 1.1 miles E.; Ber 0.6 mile S.S.E.; Shehbonpur 0.6 mile W.S.W.; and Mor Makdúmpur 1.2 miles N.E. by N.

XLIV. Akbarpur Tower Station, lat. $29^{\circ} 5'$, long. $78^{\circ} 41'$ —observed at in 1842 and 1843—is situated close to the high road from Haridwar to Moradabad, and distant about half-a-mile N.W. of the village of Akbarpur: tahsíl and pargana Amroha, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 15 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Garhi 0.4 mile S. by W.; Burhpur 0.8 mile W. by S.; and Salimpur 0.5 mile N.E. by E.

XLV. Sarkara Tower Station, lat. $29^{\circ} 16'$, long. $78^{\circ} 35'$ —observed at in 1843—is situated close to the high road from Haridwar to Moradabad, and distant about 0.6 mile S.S.E. of the village of Sarkara: tahsíl Dhámpur, pargana Sherkot, district Bijnor.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 16.3 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Rajmul 0.3 mile S.S.E.; Nasirpur Bhunwari 1.3 miles W.S.W.; and Salimpur Sani 0.8 mile S. by W.

XLVI. Haldaur Tower Station, lat. $29^{\circ} 17'$, long. $78^{\circ} 19'$ —observed at in 1843—is situated on a sandy mound (8 or 9 feet in height) in the lands of the village of Rasúlpur, and is distant about 1 mile S.W. of the large village of Haldaur: tahsíl Bijnor, pargana Daranagar, district Bijnor.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 19.7 feet high: it has a mark-stone at top. The bearings and distances of surrounding villages are:—Chajjupura 0.8 mile S.E. by E.; Uttapur 0.8 mile S.W.; and Sikandarpur Sani 1.1 miles nearly due N.

XLVII. Nandi Tower Station, lat. $29^{\circ} 17'$, long. $78^{\circ} 49'$ —observed at in 1842 and 1843—is situated in the lands of the village of Púrampur, and is distant about half-a-mile E.S.E. of the village of Nandi: tahsíl and pargana Káshipur, district Taráí.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 12 feet high: it has a mark-stone at summit. The surrounding villages are:—Púrampur 0.6 mile N.; Raipur; Haripura; and Mowa Dabra.

XLVIII. Harpálsid Hill Station, lat. $29^{\circ} 40'$, long. $78^{\circ} 36'$ —observed at in 1843—is situated on the peak immediately west of the hill of Harpálsid on the southern border of the Sub-Himalaya mountains, and is approached from Najíabad by Kotkadr and Bagnala: district Garhwál.

The station is denoted by the centre of a circle engraved on a stone which is fixed in the middle of a platform and is flush with the level of the ground. The station of 1843 was re-visited in 1866 in the course of the secondary operations of the Kumaun and Garhwál Survey, but, from the absence of information to the contrary, no alteration in its construction appears to have been made.

I.—(Of the North-East Longitudinal Series). Mábegarh Hill Station, lat. $29^{\circ} 53'$, long. $78^{\circ} 30'$ —observed at in 1842, 1843, 1850 and 1865—is situated on the hill of that name, and adjoins a rude temple to the north: pargana Ajmir, district Garhwál.

The station consists of a platform of stones and earth, 14 feet square at top, enclosing a central isolated pillar of masonry 6.9 feet

high: it has a mark-stone at 1 foot above ground level, and another at summit. The original station of 1842-43 which was common to the Budhon Meridional and the North Connecting Series—was re-visited in 1850 in the course of the operations of the North-East Longitudinal Series, and again in 1865 to originate the Kumaun and Garhwál Survey; on neither of these occasions was any alteration made in the construction of the station. The bearings and distances of surrounding villages are:—Kundra 1 mile S. by W.; Jaurási 1·8 miles W.; Harsu 1·6 miles N.; and Badoli 1·8 miles N.N.E.

XLVIII.—(*Of the Great Arc Meridional Series, Section 24° to 30°*). Sheopuri Tower Station, lat. 29° 19', long. 78° 2'—observed at in 1836, 1837, 1843 and 1866—is built on an elevated mound, apparently the site of a ruined fort, standing on a high bank which bounds the bed of the Ganges on the west, and distant about half-a-mile east of the village of Sheopuri: tahsíl Jánsath, pargana Bhúma Sambalhera, district Muzaffarnagar.

The station consists of a hollow masonry tower 40·5 feet high, having a mark-stone in the ground floor. It was originally constructed as a station of the Great Arc Meridional Series, Section 24° to 30°, in the course of the operations of which it was visited in 1836, 1837 and 1866, the Budhon Series having connected with it in 1843: no change was however made on the occasion of the subsequent visits to the original tower. The bearings and distances of surrounding places are:—Mírānpur town 3 miles S.W.; Jaspur village 1 mile N.N.E.; and Alampur 1·2 miles E.

LII.—(*Of the Great Arc Meridional Series, Section 24° to 30°*). Mahesari Tower Station, lat. 29° 30', long. 78° 11'—observed at in 1843, 1851, 1865 and 1866—is built on a sand ridge (about 20 feet in height), near the S.W. corner of the village of Mahesari: tahsíl Bijnor, pargana Mandáwar, district Bijnor.

The station consists of a tower of unburnt bricks and mud cement, 14 feet square at top, enclosing a central pillar of masonry 13·5 feet high which is solid to a height of 12 feet above ground level and perforated thereafter: it has a mark-stone at the level of the ground, and others at 7 and 12 feet respectively above this level. The station of 1843—which was 12 feet in height—was re-visited in 1851 in the course of the operations of the North-East Longitudinal Series, when the masonry pillar was found in good order and the upper mark-stone undisturbed. When again visited in 1865-66 in connection with the Great Arc Meridional Series, Section 24° to 30°, the pillar and upper mark-stone were found in good preservation: on this occasion however the height of the pillar was raised to 13½ feet, but no mark-stone was placed at its summit, a hollow cylindrical space, 4 inches in diameter, having been left for reference to the old mark-stone. The bearings and distances of surrounding places are:—Mandáwar 1·6 miles S.S.W.; Shahbazpur 1·2 miles W.; Ratanpur Raiya 0·8 mile N.N.W.; and the town of Kiratpur about 3 miles E.

February 1877.

J. B. N. HENNESSEY,

In charge of Computing Office.

BUDHON MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives additional information as to position, construction, and present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station
III *	...	Sangor	Tah. Kurai, Taluka Pitihra, Thá. Baraudia	Budhon	...
VII *	...	„	P., Tah. and Thá. Banda	Tinsi	...
I	...	Lalitpur	Tah. Mahroni, P. Máraura	Patna	The upper mark-stone wanting as reported in January 1870.
II	...	Bundelkhand Political Agency	P. Baldeogarh	Dargawa	...
III	...	Lalitpur	Tah. Mahroni, P. Bánpur	Dhandkua	The pillar fallen down as reported in May 1867.
IV	Andheri	Psagarh (Gwalior territory)	P. Marguli	Sarsud	No trace of the station found as reported in 1877.
V	...	Jhánsi	Tah. Jhánsi	Gwáli	No mark-stone found as reported in May 1867.
VI	Hanspura	„	Tah. Mau	Hanspura	No mark-stone found as reported in May 1867. A pile of earth and stones raised over the pillar in 1879.
VII	No report received.
VIII	...	Jhánsi (Gwalior territory)	P. Karera	Algi Dinara	...

NOTE.—Stations III * and VII * appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. Thá, for thána.

P. stands for pargana, Tah. for tahsil, and

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station
IX	...	Bundelkhand Political Agency	Tah. Datia	Daryapur	...
X	...	Narwar (Gwalior territory)	P. Karhia	Mahārājpur	...
XI	...	"	P. Narwar	...	...
XII	...	I'sagarh (Gwalior territory)	P. Chanderi	Karehra	...
XIII	...	Gwalior	P. Gird Gwalior	Raepur	...
XIV	...	"	P. Pichhor	Gujara	...
XV	Saníchari	"	P. Kotwál	Ántri	The pillar fallen down, only the mark remains, as reported in May 1877.
XVI	...	Sikarwári (Gwalior)	...	...	...
XVII	Gormín	Tonwarghár (Gwalior)	P. Gormín	Gormín	The tower fallen down as reported in May 1877.
XVIII	...	Bhind (Gwalior)	P. Bhind	Bhind	...
XIX	Hathkanth	Agra	P. Panáhat	Hathkanth	...
XX	...	"	Ditto.	Panáhat	...
XXI	Sarsaganj	Mainpuri	Tah. Shikohabad, Thá. Sarsaganj	Madanpur	The arch and the lower portion of the central pillar were found dug into up to the perforation.
XXII	...	Agra	P. Firozabad	Raepur	...
XXIII	Jasrána	Mainpuri	Tah. Mustafabad, Thá. Jasrána	Kushiari	About 20 feet of the pillar fallen down as reported in March 1873.
XXIV	...	...	...	...	The station was connected with the Revenue Survey line of levels in 1873, under Colonel Anderson, when the lower mark-stone was found intact and the height of summit of pillar above this mark to be 42.5 feet.
XXV	...	Etah	Tah., P. and Thá. Etah	Kilárman	The pillar 42 feet high as reported in 1874.
XXVI	Salímpur	"	Tah. and Thá. Kásganj, P. Bilráam	Salímpur	The pillar 35 feet high as reported in 1874.
XXVII	...	"	Tah. Kásganj, P. and Thá. Saháwar	Jamálpur	The pillar 25 feet high as reported in 1874.
XXVIII	Minár Sankra	Aligarh	Tah. Atrauli, P. Gangiri	Sankra	The mark-stone wanting as reported in 1867.

NOTE.—Stations XXI to XLVII were visited in 1865-66 by Mr. W. Ivey, Assistant Surveyor, who was especially deputed for the purpose. With regard to the central paka pillars, their condition when visited and the repairs effected are given in detail above. As respects the kacha towers, around the pillars, these were found either partially or wholly washed away; nor were any measures taken specially for their restoration. Mr. Ivey protected the stations in the following manner:—the summits of the pillars were capped by conical mounds of sun-dried bricks or earthwork to carry off the rainfall, and the pillars themselves were enclosed in same materials up to varying heights. After this he transferred all these stations to the charge of local officials.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station
XXIX	Mánikpur	Budaun	Tah., P. and Thá. Sahaswán	Mánikpur	The central pillar and its upper mark-stone were found uninjured.
XXX	...	"	Tah. Gunnaur, P. Asadpur	Sakrora	The central pillar and its upper mark engraved on a burnt brick were found uninjured.
XXXI	...	Bulandshahr	Tah. Anúpsahr, P. Dibai, Thá. Rámghat	Parauli	The central pillar and its upper mark-stone were found all right.
XXXII	...	Budaun	Tah. Bisauli, P. and Thá. Islámnagar	Kariámái	Ditto.
XXXIII	...	"	Tah. Gunnaur, P. and Thá. Rajpura	Rajauli	The central pillar was found half thrown down, it was raised by 3 feet with burnt bricks and mud cement, making its height about 14 feet above ground.
XXXIV	Mehtra Dharampur	Moradabad	P. Sambhal	Mehtra	The upper mark-stone was found intact, the central pillar partially dug into at base and summit.
XXXV	Benipur Chak	"	Ditto.	BánsGOPÁlpur	The central pillar and the upper mark-stone were found all right.
XXXVI	Chandanpur Khádar	"	P. Hasanpur	Chandanpur Khádar	Ditto.
XXXVII	Umra	"	P. Bilári	Barauli	The upper mark-stone was missing, and portion of the summit of the central pillar broken.
XXXVIII	Kandarki	"	P. Hasanpur	Kandarki	The central pillar and its upper mark engraved on a burnt brick were found perfect.
XXXIX	...	"	P. Sambhal	Atora	The upper mark-stone was missing, and portion of the summit of the pillar broken.
XL	...	"	P. Amroha	Sirsa	The central pillar and the mark-stone on its summit were found perfect.
XLI	Mahamdí	"	P. Hasanpur	Lút	The whole structure was found fallen down, with the exception of 4 feet of the central pillar above ground. The pillar was raised 4 feet in height above the old remains, with burnt bricks and mud cement.
XLII	Kázipur	"	Tah. Moradabad	Bhatauli	The central pillar and the mark-stone on its summit were found perfect.
XLIII	Lodipur Milik	Bijnor	Tah. Chándpur, P. Burhpur	Lodipur Milik	The central pillar and the mark engraved on a burnt brick, on its summit, were found perfect.

NOTE.—P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station
XLIV	...	Moradabad	Tah. Amroha	Akbarpur	The central pillar was found standing and slightly dug into at the base, and the mark-stone missing.
XLV	...	Bijnor	Tah. and P. Dhámpur	Bhika Ját	The central pillar and the mark-stone on its summit were found perfect, the edges of the pillar slightly decayed.
XLVI	...	"	Tah. Bijnor, P. Dáranagar	Rasúlpur	The central pillar and the mark-stone on its summit were found perfect.
XLVII	Nanda	Tarái	P. Káshipur	Púranpur	The central pillar was found fallen down to within $1\frac{1}{2}$ feet of the ground level, this was repaired, raised to $2\frac{1}{2}$ feet above ground, with burnt bricks laid in mud cement, and a mark-stone placed on it.
XLVIII	...	Garhwál	P. Talla Salán, Táluka Bhábar	Bágnála	A portion of the masonry given way as reported in 1879.
I	...	"	P. Ganga Salán, Patti Ajmír	Nali Badholi	A portion of the masonry given way as reported in 1878.
XLVIII *	...	Muzaffarnagar	P. and Tah. Jánsath, Thá. Míránpur	Sheopuri	... ..
LII	...	Bijnor	Tah. Bijnor, P. Mandáwar	Mahesari	... ..

NOTE.—Station I appertains to the North-East Longitudinal Series.
P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

Stations XLVIII* and LII appertain to the Great Arc Meridional Series, Section 24° to 30°.

September, 1882.

J. B. N. HENNESSEY,
In charge of Computing Office.

BUDHON MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. TRIANGLES.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
1	Budhon, III	1'10	65 18 9'77	5'1693276	147682'0	27'970
	Tinsmál, VII	1'10	36 17 41'38	4'9832673	96220'4	18'224
	Patna, I	1'10	78 24 8'85	5'2020309	159232'2	30'158
2	Tinsmál, VII	1'85	61 1 25'95	5'2302896	169937'6	32'185
	Patna, I	1'86	69 29 22'98	5'2599285	181940'1	34'458
	Dargawa, II	1'85	49 29 11'07	5'1693276	147682'0	27'970
3	Patna, I	1'48	40 43 36'35	5'0731171	118336'0	22'412
	Dargawa, II	1'49	69 43 33'56	5'2307924	170134'5	32'222
	Dhandkúa, III	1'49	69 32 50'09	5'2302896	169937'6	32'185
4	Patna, I	2'03	56 48 43'89	5'2243154	167616'0	31'745
	Dhandkúa, III	2'04	65 2 7'10	5'2590521	181573'4	34'389
	Andhiári, IV	2'04	58 9 9'01	5'2307924	170134'5	32'222
5	Dhandkúa, III	2'08	68 20 25'89	5'2768654	189175'7	35'829
	Andhiári, IV	2'08	56 13 31'48	5'2283874	169194'9	32'044
	Gwáli, V	2'07	55 26 2'63	5'2243154	167616'0	31'745

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Budhon, III, and Tinsmál, VII, appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

BUDHON MERIDIONAL SERIES.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
6	Dhandkúa, III	"	"			
	Gwáli, V	2'08	60 23 39'92	5'2443503	175529'6	33'244
	Kathera, VI	2'08	62 40 7'50	5'2536997	179349'3	33'968
7	Gwáli, V	2'08	56 56 12'58	5'2283874	169194'9	32'044
	Kathera, VI	1'27	38 27 19'24	5'0400524	109661'1	20'769
	Bhitári, VII	1'27	57 0 33'47	5'1699658	147899'2	28'011
8	Gwáli, V	1'28	84 32 7'29	5'2443503	175529'6	33'244
	Bhitári, VII	1'13	54 35 51'47	5'0974530	125156'4	23'704
	Algi, VIII	1'13	50 59 24'08	5'0766814	119311'3	22'597
9	Bhitári, VII	1'14	74 24 44'45	5'1699658	147899'2	28'011
	Algi, VIII	.82	65 3 15'56	5'0784683	119803'2	22'690
	Daryapur, IX	.81	43 38 36'38	4'9599559	91191'8	17'271
10	Algi, VIII	.82	71 18 8'06	5'0974530	125156'4	23'704
	Daryapur, IX	1'31	66 16 16'61	5'1781672	150718'7	28'545
	Maharájpur, X	1'31	67 2 10'98	5'1806704	151589'9	28'710
11	Daryapur, IX	1'31	46 41 32'41	5'0784683	119803'2	22'690
	Maharájpur, X	1'21	40 58 4'93	5'0314303	107505'4	20'361
	Majhár, XIV	1'22	72 13 31'28	5'1935238	156143'5	29'573
12	Maharájpur, X	1'22	66 48 23'79	5'1781672	150718'7	28'545
	Majhár, XIV	.83	76 21 32'40	5'1103651	128933'3	24'419
	Ráepur, XIII	.83	49 31 1'44	5'0039476	100913'1	19'112
13	Algi, VIII	.83	54 7 26'16	5'0314303	107505'4	20'361
	Maharájpur, X	1'50	56 45 54'93	5'1567811	143476'6	27'174
	Narwar, XI	1'50	61 8 20'47	5'1767521	150228'4	28'452
14	Maharájpur, X	1'50	62 5 44'60	5'1806704	151589'9	28'710
	Narwar, XI	.60	43 41 56'21	5'0121057	102826'7	19'475
	Karaia, XII	.59	30 52 39'52	4'8830021	76383'9	14'467
15	Maharájpur, X	.60	105 25 24'27	5'1567811	143476'6	27'174
	Karaia, XII	.53	59 53 1'24	4'9590868	91009'5	17'237
	Ráepur, XIII	.53	73 33 51'70	5'0039476	100913'1	19'112
16	Majhár, XIV	.52	46 33 7'06	4'8830021	76383'9	14'467
	Ráepur, XIII	.80	100 21 44'02	5'2125181	163124'1	30'895
	Jhánkri, XVI	.79	28 36 16'95	4'8997812	79392'8	15'037
17	Ráepur, XIII	.79	51 1 59'03	5'1103651	128933'3	24'419
	Jhánkri, XVI	.86	40 42 28'51	5'0350055	108394'1	20'529
	Sánichri, XV	.86	38 15 26'99	5'0124512	102908'5	19'490
18	Majhár, XIV	.87	101 2 4'50	5'2125181	163124'1	30'895
	Ráepur, XIII	.98	46 7 14'06	5'0124512	102908'5	19'490
	Sánichri, XV	.98	69 18 46'13	5'1256909	133564'5	25'296
19	Jhánkri, XVI	.98	64 33 59'81	5'1103651	128933'3	24'419
	Sánichri, XV	.84	70 45 8'27	5'0904426	123152'3	23'324
	Gúrmí, XVII	.84	53 2 59'50	5'0180567	104245'4	19'743
20	Jhánkri, XVI	.84	56 11 52'23	5'0350055	108394'1	20'529
	Gúrmí, XVII	.74	47 50 57'33	4'9712527	93595'0	17'726
	Bhind, XVIII	.75	76 29 11'95	5'0890180	122749'0	23'248
		.75	55 39 50'72	5'0180567	104245'4	19'743

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
21	Gúrmi, XVII	60	57 45 4'50	4'9633306	91903'2	17'406
	Bhind, XVIII	61	62 47 5'75	4'9851405	96636'4	18'302
	Athgath, XIX	60	59 27 49'75	4'9712527	93595'0	17'726
22	Gúrmi, XVII	77	65 42 21'93	5'0522102	112774'3	21'359
	Athgath, XIX	76	62 56 23'71	5'0421273	110186'2	20'869
	Panáhat, XX	76	51 21 14'36	4'9851405	96636'4	18'302
23	Athgath, XIX	62	61 29 7'54	5'0098981	102305'3	19'376
	Panáhat, XX	62	42 54 27'16	4'8990902	79266'6	15'013
	Sherpur, XXI	62	75 36 25'30	5'0522102	112774'3	21'359
24	Panáhat, XX	67	58 26 41'42	4'9884271	97370'4	18'442
	Sherpur, XXI	66	58 0 18'27	4'9863624	96908'6	18'354
	Firozabad, XXII	67	63 33 0'31	5'0098981	102305'3	19'376
25	Sherpur, XXI	65	71 28 6'01	5'0369327	108876'2	20'620
	Firozabad, XXII	64	50 32 31'92	4'9477261	88659'7	16'792
	Baragaon, XXIII	65	57 59 22'07	4'9884271	97370'4	18'442
26	Firozabad, XXII	92	66 30 21'91	5'0930261	123887'1	23'463
	Baragaon, XXIII	92	59 47 19'95	5'0672111	116737'7	22'109
	Pondri, XXIV	91	53 42 18'14	5'0369327	108876'2	20'620
27	Baragaon, XXIII	98	62 54 57'89	5'0922214	123657'8	23'420
	Pondri, XXIV	97	53 57 33'49	5'0503986	112304'9	21'270
	Kilármáo, XXV	98	63 7 28'62	5'0930261	123887'1	23'463
28	Pondri, XXIV	98	57 55 48'43	5'0697293	117416'6	22'238
	Kilármáo, XXV	98	58 53 16'24	5'0741940	118629'9	22'468
	Salámpur, XXVI	99	63 10 55'33	5'0922214	123657'8	23'420
29	Kilármáo, XXV	70	54 56 14'63	4'9963783	99169'6	18'782
	Salámpur, XXVI	69	49 20 8'25	4'9633247	91901'9	17'406
	Jamálpur, XXVII	70	75 43 37'12	5'0697293	117416'6	22'238
30	Salámpur, XXVI	75	80 27 37'63	5'1015468	126341'7	23'928
	Jamálpur, XXVII	74	48 49 5'33	4'9841721	96421'1	18'262
	Sankráo, XXVIII	74	50 43 17'04	4'9963783	99169'6	18'782
31	Jamálpur, XXVII	63	35 36 24'33	4'8687472	73917'5	14'000
	Sankráo, XXVIII	64	60 2 31'15	5'0413751	109995'5	20'832
	Sarsotha, XXIX	64	84 21 4'52	5'1015468	126341'7	23'928
32	Sankráo, XXVIII	36	67 27 52'43	4'8901521	77651'9	14'707
	Sarsotha, XXIX	35	50 59 11'94	4'8150687	65323'4	12'372
	Sakrora, XXX	35	61 32 55'63	4'8687472	73917'5	14'000
33	Sarsotha, XXIX	28	57 42 23'24	4'8266265	67085'2	12'706
	Sakrora, XXX	28	44 12 14'96	4'7429723	55331'5	10'479
	Kariámái, XXXII	29	78 5 21'80	4'8901521	77651'9	14'707
34	Sakrora, XXX	25	50 32 9'19	4'7423343	55250'3	10'464
	Kariámái, XXXII	25	59 50 44'37	4'7915573	61881'0	11'720
	Mehtra, XXXIV	25	69 37 6'44	4'8266265	67085'2	12'706
35	Sakrora, XXX	32	67 2 52'69	4'8670317	73626'1	13'944
	Mehtra, XXXIV	32	62 14 35'62	4'8497616	70755'7	13'401
	Rajauli, XXXIII	32	50 42 31'69	4'7915573	61881'0	11'720

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
36	Sankráo, XXVIII	"	"			
	Sakrora, XXX	.33	58 56 22.82	4.8372038	68739.1	13.019
	Parauli, XXXI	.33	66 33 57.62	4.8670283	73625.5	13.944
37	Sakrora, XXX	.32	54 29 39.56	4.8150687	65323.4	12.372
	Parauli, XXXI	.37	70 5 48.01	4.9037644	80124.3	15.175
	Rajauli, XXXIII	.36	56 7 56.35	4.8497616	70755.7	13.401
38	Mehtra, XXXIV	.36	53 46 15.64	4.8372038	68739.1	13.019
	Rajauli, XXXIII	.39	59 54 3.90	4.8805517	75954.2	14.385
	Bánsopál, XXXV	.40	63 6 6.80	4.8937284	78294.0	14.828
39	Rajauli, XXXIII	.39	56 59 49.30	4.8670317	73626.1	13.944
	Bánsopál, XXXV	.39	55 37 36.82	4.8578009	72077.7	13.651
	Ohandanpur, XXXVI	.39	63 56 28.51	4.8945904	78449.5	14.858
40	Bánsopál, XXXV	.39	60 25 54.67	4.8805517	75954.2	14.385
	Ohandanpur, XXXVI	.34	54 44 8.87	4.8245758	66769.1	12.646
	Kandarki, XXXVIII	.34	63 27 2.37	4.8642249	73151.8	13.855
41	Bánsopál, XXXV	.34	61 48 48.76	4.8578009	72077.7	13.651
	Kandarki, XXXVIII	.31	59 27 32.60	4.8322276	67956.0	12.870
	Atora, XXXIX	.31	52 33 4.04	4.7968539	62640.3	11.864
42	Mehtra, XXXIV	.31	67 59 23.36	4.8642249	73151.8	13.855
	Bánsopál, XXXV	.37	58 29 29.60	4.8614015	72677.8	13.765
	Barauli, XXXVII	.36	54 48 30.81	4.8430198	69665.8	13.194
43	Bánsopál, XXXV	.37	66 41 59.59	4.8937284	78294.0	14.828
	Barauli, XXXVII	.34	70 3 27.78	4.8926775	78104.8	14.793
	Atora, XXXIX	.34	48 55 49.75	4.7968539	62640.3	11.864
44	Kandarki, XXXVIII	.34	61 0 42.47	4.8614015	72677.8	13.765
	Atora, XXXIX	.38	63 45 26.37	4.8895968	77552.7	14.688
	Sirsa, XL	.38	64 26 6.14	4.8920916	77999.5	14.773
45	Atora, XXXIX	.37	51 48 27.49	4.8322276	67956.0	12.870
	Sirsa, XL	.34	46 52 26.71	4.7868408	61212.6	11.593
	Bhatauli, XLII	.34	65 30 20.69	4.8826480	76321.7	14.455
46	Sirsa, XL	.35	67 37 12.60	4.8895968	77552.7	14.688
	Bhatauli, XLII	.31	65 23 49.00	4.8558889	71761.1	13.591
	Akbarpur, XLIV	.31	63 44 48.48	4.8499417	70785.1	13.406
47	Sirsa, XL	.31	50 51 22.52	4.7868408	61212.6	11.593
	Akbarpur, XLIV	.33	58 19 37.39	4.8376105	68803.5	13.031
	Milik, XLIII	.34	60 33 37.57	4.8476064	70405.5	13.334
48	Kandarki, XXXVIII	.34	61 6 45.04	4.8499417	70785.1	13.406
	Sirsa, XL	.37	58 50 3.37	4.8615230	72698.1	13.769
	Lút, XLI	.36	54 31 11.50	4.8400080	69184.4	13.103
49	Sirsa, XL	.37	66 38 45.13	4.8920916	77999.5	14.773
	Lút, XLI	.37	64 26 31.85	4.8826709	76325.7	14.456
	Milik, XLIII	.36	56 19 22.02	4.8476064	70405.5	13.334
50	Akbarpur, XLIV	.37	59 14 6.13	4.8615230	72698.1	13.769
	Milik, XLIII	.36	65 1 6.34	4.8829478	76374.4	14.465
	Sarkára, XLV	.36	60 14 12.40	4.8641688	73142.3	13.853
		.36	54 44 41.26	4.8376105	68803.5	13.031

PRINCIPAL TRIANGULATION. TRIANGLES.

15—J.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
51	Milik, XLIII	"	° ' "			
	Sarkára, XLV	·47	62 57 43·93	4·9366917	86435·4	16·371
	Haldaur, XLVI	·48	65 7 44·57	4·9446874	88041·5	16·675
52	Sarkára, XLV	·47	51 54 31·50	4·8829478	76374·4	14·465
	Haldaur, XLVI	1·00	88 23 43·66	5·2240912	167529·5	31·729
	Harpálsid, XLVIII	1·00	60 33 27·57	5·1642053	145950·4	27·642
53	Akbarpur, XLIV	·99	31 2 48·77	4·9366917	86435·4	16·371
	Sarkára, XLV	·41	56 29 1·04	4·8801843	75890·0	14·373
	Nandi, XLVII	·42	70 2 47·92	4·9322743	85560·7	16·205
54	Sarkára, XLV	·41	53 28 11·04	4·8641688	73142·3	13·853
	Nandi, XLVII	·87	81 40 59·46	5·1888038	154455·7	29·253
	Harpálsid, XLVIII	·86	69 13 39·34	5·1642053	145950·4	27·642
55	Haldaur, XLVI	·86	29 5 21·20	4·8801843	75890·0	14·373
	Harpálsid, XLVIII	1·02	57 57 5·10	5·1523302	142013·7	26·897
	Mahesari, LII	1·02	32 54 28·08	4·9591707	91027·1	17·240
56	Haldaur, XLVI	1·02	89 8 26·82	5·2240912	167529·5	31·729
	Mahesari, LII	·53	56 0 34·87	4·9274737	84620·1	16·027
	Sheopuri, XLVIII	·53	60 52 34·12	4·9501475	89155·4	16·885
57	Harpálsid, XLVIII	·53	63 6 51·01	4·9591707	91027·1	17·240
	Mahesari, LII	·94	91 57 46·87	5·2235428	167318·0	31·689
	Mábegarh, I	·94	30 0 48·08	4·9229431	83742·0	15·860
		·94	58 1 25·05	5·1523302	142013·7	26·897

NOTE.—Stations Sheopuri, XLVIII, and Mahesari, LII appertain to the Great Arc Series—Section 24° to 30°, and Mábegarh, I appertains to the North-East Longitudinal Series.

December 1878.

J. B. N. HENNESSEY,
In charge of Computing Office.

BUDHON MERIDIONAL SERIES.

SECONDARY TRIANGULATION. TRIANGLES.

PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles	
58	Budhon, III Tinsmál, VII Sagoni	12 7 27 h.s. 161 46 37	5.029163 4.733187 5.202031	106945 54099 159232	20.254 10.246 30.158	Inch 12 "	63	Patna, I Samaspur Pandua	23 40 14 18 13 29 138 6 17	4.522907 4.414436 4.743873	33335 25968 55446	6.314 4.918 10.501	Inch 12 "
59	Budhon, III Patna, I Sagoni	53 10 44 h.s. 92 39 8	4.887100 4.733187 4.983267	77108 54099 96220	14.604 10.246 18.224	" " "	64	Tinsmál, VII Patna, I Dhoban	59 23 15 19 56 9 100 40 36	5.111729 4.709625 5.169328	129339 51242 147682	24.496 9.705 27.970	" 15 12
60	Budhon, III Patna, I Samaspur	32 17 31 35 41 41 112 0 48	4.743873 4.782158 4.983267	55446 60556 96220	10.501 11.469 18.224	" " "	65	Patna, I Dargawa, II Dhoban	49 33 16 81 36 2	5.116371 5.111729 5.230290	130729 129339 169938	24.759 24.406 32.185	15 12 12
61	Budhon, III Sagoni Samaspur	20 53 13 h.s. 62 33 55	4.337091 4.782158 4.733187	21732 60556 54099	4.116 11.469 10.246	" " "	66	Tinsmál, VII Dargawa, II Lakhanjhir	48 57 28 111 52 7	5.169863 4.808807 5.259929	147864 64388 181940	28.005 12.195 34.458	" " "
62	Budhon, III Patna, I Pandua	15 4 8 59 21 55 105 33 57	4.414436 4.934213 4.983267	25968 85943 96220	4.918 16.277 18.224	" 15 12	67	Patna, I Dargawa, II Lakhanjhir	60 27 43 89 13 29	5.169863 4.933387 5.230290	147864 85780 169938	28.005 16.246 32.185	15 12 12

NOTES.—1. Names followed by Roman numerals are those of Principal Stations. Stations Budhon, III, and Tinsmál, VII appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.
2. The values of the side are given in the same line with the opposite angle.

SECONDARY TRIANGULATION. TRIANGLES.

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No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles				Log. feet	Feet	Miles	
68	Tinsmál, VII Lakhanjúr Káli.	h.s. " "	4° 58' 50"	41512	7.862	81	Patna, I Pandúa Barodia	57° 33' 10"	4° 622171	41896	7.935	81	Patna, I Pandúa Barodia	57° 33' 10"	4° 622171	41896	7.935	Inch 12
69	Patna, I Lakhanjúr Káli	h.s. " "	59° 41' 57"	41512	7.862	82	Patna, I Lakhanjúr Mahroa	37° 41' 34"	4° 721006	52603	9.963	82	Patna, I Lakhanjúr Mahroa	37° 41' 34"	4° 721006	52603	9.963	" "
70	Tinsmál, VII Lakhanjúr Jálampur	h.s. " "	45° 10' 42"	49466	9.368	83	Patna, I Pandúa Mahroa	65° 45' 31"	4° 765104	58224	11.027	70	Patna, I Pandúa Mahroa	65° 45' 31"	4° 765104	58224	11.027	" "
71	Lakhanjúr Dhoban Jálampur	h.s. " "	74° 1' 32"	58651	11.108	84	Patna, I Barodia Ahmoi	84° 14' 1"	4° 701739	50320	9.530	71	Patna, I Barodia Ahmoi	84° 14' 1"	4° 701739	50320	9.530	" "
72	Tinsmál, VII Jálampur Jagthar Hill Staff	h.s.	37° 51' 41"	16660	3.155	85	Patna, I Pandúa Dongra Hill Temple	136° 55' 59"	4° 580904	38008	7.216	72	Patna, I Pandúa Dongra Hill Temple	136° 55' 59"	4° 580904	38008	7.216	" "
73	Jálampur Jagthar Hill Staff Benaika Temple	h.s. s.	106° 32' 35"	30410	5.759	86	Patna, I Mahroa Dongra Hill Temple	71° 10' 28"	4° 783342	60721	11.500	73	Patna, I Mahroa Dongra Hill Temple	71° 10' 28"	4° 783342	60721	11.500	" "
74	Tinsmál, VII Jálampur Morári Hill Tree	h.s.	24° 32' 19"	15328	2.903	87	Samaspur Pandúa Rámpura Hill Staff	61° 58' 0"	4° 535571	34322	6.500	74	Samaspur Pandúa Rámpura Hill Staff	61° 58' 0"	4° 535571	34322	6.500	" "
75	Jálampur Benaika Temple Morári Hill Tree	h.s. s.	151° 8' 51"	35344	6.694	88	Pandúa Barodia Mandri	30° 48' 18"	4° 343275	22043	4.175	75	Jálampur Benaika Temple Morári Hill Tree	151° 8' 51"	4° 343275	22043	4.175	" "
76	Tinsmál, VII Jálampur Singan	h.s.	20° 46' 42"	67140	12.716	89	Barodia Ahmoi Mandri	24° 6' 44"	4° 498502	31514	5.969	76	Tinsmál, VII Jálampur Singan	20° 46' 42"	4° 498502	31514	5.969	" "
77	Lakhanjúr Jálampur Singan	h.s. " "	49° 38' 32"	67140	12.716	90	Pandúa Mandri Gorar	16° 25' 46"	4° 262280	18293	3.465	77	Lakhanjúr Jálampur Singan	49° 38' 32"	4° 262280	18293	3.465	" "
78	Tinsmál, VII Lakhanjúr Bhero	h.s. " "	52° 34' 24"	82301	15.587	91	Ahmoi Mandri Maltaun	13° 32' 1"	4° 183844	15270	2.892	78	Tinsmál, VII Lakhanjúr Bhero	52° 34' 24"	4° 183844	15270	2.892	" "
79	Tinsmál, VII Singan Bhero	h.s. " "	111° 55' 19"	103621	19.625	92	Mandri Gorar Maltaun	54° 55' 49"	4° 196180	15710	2.975	79	Tinsmál, VII Singan Bhero	111° 55' 19"	4° 196180	15710	2.975	" "
80	Patna, I Samaspur Barodia	h.s. " "	33° 52' 56"	31121	5.894	98	Patna, I Dhandkúa, III Bara Dongra Hill Temple	57° 43' 39"	5° 167930	147207	27.880	80	Patna, I Samaspur Barodia	33° 52' 56"	5° 167930	147207	27.880	" "

NOTE.—Station Tinsmál, VII appertains to the Calcutta Longitudinal Series of the South-East Quadrilateral. † Instrument not known. * Base deduced by two sides and included angle.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
94	Dhandkúa, III Andhiári, IV Bara Dongra Hill Temple	45 1 13 58 35 58	5° 08' 34.2 5° 16' 73.0 5° 22' 43.15	121995 147207 167616	23.105 27.880 31.745	107	Dhandkúa, III Mora Barh	71 22 49 26 44 52 81 52 19	5° 05' 72.82 4° 73' 39.04 5° 07' 62.46	114099 54188 119192	21.610 10.263 22.574	Inch 15 "
95	Dargawa, II Dhandkúa, III Sarkaura	56 44 38 21 4 7 102 11 15	5° 00' 53.42 4° 63' 86.99 5° 07' 31.17	101238 43521 118336	19.174 8.243 22.412	108	Dhandkúa, III Mamaun Bijli	86 18 17 12 19 26 81 22 17	4° 72' 63.54 4° 05' 67.29 4° 72' 25.15	53279 111395 52785	10.091 2.158 9.997	" 9 15
96	Dargawa, II Dhandkúa, III Mamaun	10 6 26 13 3 37 156 49 57	4° 72' 25.15 4° 83' 23.22 5° 07' 31.17	52785 67971 118336	9.997 12.873 22.412	109	Dhandkúa, III Barh Bijli	79 16 2 12 8 9 88 35 49	4° 72' 63.70 4° 05' 67.29 4° 73' 39.04	53256 111395 54188	10.086 2.158 10.263	" "
97	Dargawa, II Sarkaura Tehri Palace	60 11 6 85 13 5	4° 82' 28.41 4° 88' 20.89 4° 63' 86.99	66503 76382 43521	12.595 14.466 8.243	110	Dhandkúa, III Barh Bila Hill Staff	69 36 14 34 53 44	4° 71' 08.43 4° 50' 54.20 4° 73' 39.04	52462 32020 54188	9.936 6.064 10.263	" "
98	Dhandkúa, III Sarkaura Tehri Palace	27 17 5 16 58 10	4° 82' 28.41 4° 62' 67.61 5° 00' 53.42	66503 42341 101238	12.595 8.019 19.174	111	Dhandkúa, III Pabba Ratangawán	54 52 30 84 54 17	5° 05' 44.72 4° 95' 18.22 5° 14' 00.53	113363 89500 138055	21.470 16.951 26.147	" "
99	Dhandkúa, III Andhiári, IV Ero	20 47 17 64 46 4 94 26 39	4° 77' 57.44 5° 18' 20.74 5° 22' 43.15	59668 152081 167616	11.301 28.803 31.745	112	Dhandkúa, III Barh Ratangawán	74 36 14 70 34 35 34 49 11	4° 96' 13.99 4° 95' 18.22 4° 73' 39.04	91495 89500 54188	17.329 16.951 10.263	" "
100	Dhandkúa, III Andhiári, IV Pabba	66 30 47 48 21 17 65 7 56	5° 22' 90.15 5° 14' 00.53 5° 22' 43.15	169440 138055 167616	32.091 26.147 31.745	113	Dhandkúa, III Pabba Mohangarh Fort	26 45 46 25 11 14	4° 89' 73.17 4° 87' 79.6 5° 14' 00.53	78944 74610 138055	14.951 14.131 26.147	" "
101	Andhiári, IV Gwáli, V Pabba	7 52 17 47 24 26 124 43 17	4° 49' 85.92 5° 22' 90.15 5° 27' 68.65	31520 169440 189176	5.970 32.091 35.829	114	Dhandkúa, III Barh Mohangarh Fort	46 29 30 87 0 52	4° 73' 38.89 4° 87' 79.6 4° 73' 39.04	54186 74610 54188	10.263 14.131 10.263	" "
102	Dhandkúa, III Gwáli, V Banarsa	27 17 18 19 18 21 133 24 21	5° 02' 84.59 4° 88' 64.05 5° 22' 83.97	106772 76996 169195	20.222 14.582 32.044	115	Dhandkúa, III Ratangawán Majhgawán Hill Staff	40 30 37 15 49 45	4° 8441.59 4° 4673.21 4° 9518.22	69849 29331 89500	13.229 5.555 16.951	" "
103	Dhandkúa, III Pabba Banarsa	29 6 59 27 53 23 122 59 38	4° 90' 35.91 4° 88' 64.05 5° 14' 00.53	80092 76996 138055	15.169 14.582 26.147	116	Andhiári, IV Bara Dongra Hill Temple Birári	55 42 20 76 45 29	5° 01' 51.05 4° 96' 59.29 5° 08' 63.42	103539 92455 121995	19.610 17.510 23.105	" "
104	Dhandkúa, III Gwáli, V Mora	49 49 24 44 30 57 85 33 39	5° 11' 28.19 5° 07' 62.46 5° 22' 83.97	129664 119192 169195	24.558 22.574 32.044	117	Andhiári, IV Ero Birári	61 52 26 78 50 28 39 17 6	4° 91' 06.43 4° 96' 59.29 4° 77' 57.44	83108 92455 59668	15.740 17.510 11.301	" "
105	Gwáli, V Bhitári, VII Mora	56 30 33 54 46 33 68 42 54	5° 12' 18.02 5° 11' 28.19 5° 16' 99.66	132374 129664 147899	25.071 24.558 28.011	118	Andhiári, IV Birári Kálapahár	44 48 39 15 30 58 119 40 23	4° 87' 50.23 4° 45' 43.16 4° 96' 59.29	74993 28465 92455	14.203 5.391 17.510	" "
106	Dhandkúa, III Andhiári, IV Barh	46 47 3 16 50 7 116 22 50	5° 13' 46.70 4° 73' 39.04 5° 22' 43.15	136355 54188 167616	25.825 10.263 31.745	119	Ero Birári Kálapahár	56 56 41 54 48 4 68 15 15	4° 87' 50.23 4° 8640.09 4° 91' 06.43	74993 73115 83108	14.203 13.848 15.740	15 "

† Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
120	Andhiári, IV Gwáli, V Amarpur	h.s. 33 37 6 132 34 38	4° 78' 45.8 5° 15' 01.3 5° 27' 08.65	61300 142237 189176	11.610 26.939 35.829	153	Gwáli, V Bhitári, VII Sanyer Hill Staff	8 19 40 9 35 24	4° 842' 78.3 4° 903' 57.2 5° 1699' 66	60628 80089 147899	13.187 15.168 28.011	Inch 15 "
121	Gwáli, V Pabba Amarpur	h.s. 81 1 32 70 4 1 28 54 27	4° 80' 09.38 4° 78' 7.458 4° 49' 05.92	64408 61300 31520	12.108 11.610 5.970	134	Gwáli, V Pabba Sanyer Hill Staff	117 28 49 46 3 27	4° 994' 22.4 4° 903' 57.2 4° 498' 59.2	98679 80089 31520	18.689 15.168 5.970	" " "
122	Andhiári, IV Pabba Gurar	h.s. 50 44 26 87 41 58	5° 11' 02.68 5° 05' 11.43 5° 22' 01.5	131301 112498 169440	24.868 21.306 32.091	135	Gwáli, V Bhitári, VII Jhansí Fort	18 3 22 42 11 10	4° 722' 67.0 5° 058' 45.3 5° 1699' 66	52804 114407 147899	10.001 21.668 28.011	" " "
123	Andhiári, IV Amarpur Gurar	h.s. 51 13 19 99 42 48	4° 84' 37.39 5° 05' 11.43 5° 15' 30.13	70103 112498 142237	13.277 21.306 26.939	136	Gwáli, V Algi, VIII Jhansí Fort	36 32 31 68 5 33	4° 865' 82.2 5° 058' 45.3 5° 076' 68.1	73421 114407 119311	13.906 21.668 22.597	" " "
124	Andhiári, IV Gurar Jhakaura	h.s. 44 4 43 53 10 32 82 44 45	4° 89' 70.21 4° 95' 79.82 5° 05' 11.43	78890 90778 112498	14.941 17.193 21.306	137	Gwáli, V Bhitári, VII Lahar Hill Staff	22 55 51 45 54 23	4° 790' 93.1 5° 056' 53.7 5° 1699' 66	61792 113904 147899	11.703 21.573 28.011	" " "
125	Pabba Gurar Jhakaura	h.s. 34 31 26 111 29 0	4° 89' 70.21 4° 90' 29.32 5° 11' 02.68	78890 79971 131301	14.941 15.146 24.868	138	Gwáli, V Algi, VIII Lahar Hill Staff	31 40 2 69 29 32	4° 805' 11.8 5° 056' 53.7 5° 076' 68.1	63844 113904 119311	12.092 21.573 22.597	" " "
126	Gwáli, V Mora Jár Hill Staff	h.s. 22 47 31 55 13 31	4° 71' 05.31 5° 03' 09.42 5° 11' 02.68	51349 108879 129664	9.725 20.621 24.558	139	Gwáli, V Algi, VIII Ghatoli Hill Staff	52 14 47 30 32 21	4° 978' 11.8 4° 786' 10.6 5° 076' 68.1	95086 61109 119311	18.009 11.574 22.597	" " "
127	Kathera, VI Mora Jár Hill Staff	h.s. 45 12 19 69 9 28	4° 71' 05.31 4° 83' 01.04 4° 81' 09.90	51349 67625 65916	9.725 12.808 12.484	140	Kathera, VI Bhitári, VII Barwa Sagar High Tower	13 55 56 39 46 7	4° 515' 36.1 4° 939' 72.0 5° 040' 05.2	32761 87040 109661	6.205 16.485 20.769	" " "
128	Gwáli, V Pabba Talaphári	h.s. 58 36 44 99 12 11 22 11 5	4° 85' 28.53 4° 91' 59.40 4° 49' 05.92	71261 82402 31520	13.496 15.607 5.970	141	Kathera, VI Bhitári, VII Korar Hill Fort	29 17 34 54 16 1	4° 732' 35.3 4° 952' 22.2 5° 040' 05.2	53995 89582 109661	10.226 16.966 20.769	" " "
129	Gwáli, V Amarpur Talaphári	h.s. 22 24 48 115 20 21 42 14 51	4° 54' 11.23 4° 91' 59.40 4° 78' 7.458	34763 82402 61300	6.584 15.607 11.610	142	Bhitári, VII Daryapur, IX Korar Hill Fort	105 9 9 26 19 54	5° 070' 02.6 4° 732' 35.3 4° 9599' 56	117497 53995 91192	22.253 10.226 17.271	" " "
130	Amarpur Talaphári Ranha Hill Staff	h.s. 57 8 19 71 38 12	4° 57' 35.18 4° 62' 05.48 4° 54' 11.23	37456 42320 34763	7.094 8.015 6.584	143	Bhitári, VII Sonania Orchha Temple	25 21 40 86 28 31	4° 359' 62.6 4° 727' 03.3 4° 695' 52.0	22889 53338 49004	4.335 10.102 9.395	" " "
131	Gwáli, V Kathera, VI Sonania	h.s. 30 44 54 124 59 32	4° 94' 46.48 5° 03' 09.593 5° 24' 13.50	88034 109545 175530	16.673 20.747 33.244	144	Bhitári, VII Algi, VIII Chandeva	46 0 35 55 25 19 78 34 6	4° 963' 16.1 5° 021' 74.2 5° 097' 45.3	91867 105134 125156	17.399 19.912 23.704	" " "
132	Kathera, VI Bhitári, VII Sonania	h.s. 26 15 41 51 44 38 101 59 41	4° 69' 55.20 4° 94' 46.48 5° 040' 05.2	49604 88034 109661	9.395 16.673 20.769	145	Algi, VIII Maharajpur, X Chandeva	54 29 36 87 16 54 88 13 30	5° 091' 52.9 4° 963' 16.1 5° 180' 67.0	123461 91867 151590	23.383 17.399 28.710	" " "

* Base deduced by two sides and included angle. † Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
146	Bhitári, VII Algi, VIII Gharabo	h.s. 30 32 59 37 18 8 112 9 2	4.836826 4.913236 5.007453	68679 81891 125156	13.007 15.510 23.704	159	Maharájpur, X Chandeva Bharani	h.s. 43 43 36 112 0 56	4.738086 4.964026 5.091529	54712 92051 123461	10.362 17.434 23.383	Inch 15
147	Algi, VIII Chandeva Gharabo	h.s. 18 7 11 38 46 14 123 6 35	4.532876 4.836826 4.963161	34110 68679 91867	6.460 13.007 17.399	160	Chandeva Gharabo Sonával Temple	h.s. 99 35 6 50 53 20	4.834082 4.730006 4.532876	68247 53704 34110	12.926 10.171 6.460	"
148	Bhitári, VII Daryapur, IX Amra Fort	" 55 23 31 66 1 15	4.944215 4.989586 4.959956	87946 97631 91192	16.656 18.491 17.271	161	Algi, VIII Chandeva Ráon	h.s. 62 58 19 51 55 39 65 6 2	4.955303 4.901032 4.963161	90220 79732 91867	17.087 15.101 17.399	"
149	Bhitári, VII Daryapur, IX Bachondono Hill Temple	" 39 31 3 42 24 51	4.767948 4.793248 4.959956	58607 62122 91192	11.100 11.766 17.271	162	Maharájpur, X Chandeva Ráon	h.s. 46 27 48 36 17 51 97 14 21	4.955303 4.867310 5.091529	90220 73673 123461	17.087 13.953 23.383	"
150	Bhitári, VII Chandeva Bachondono Hill Temple	h.s. 58 33 44 36 4 57	4.954225 4.793248 5.021742	89996 62122 105134	17.045 11.766 19.912	163	Daryapur, IX Maharájpur, X Gujára Hill Fort	" 39 45 15 68 53 5	5.007402 5.171380 5.178167	101719 148381 150719	19.265 28.103 28.545	"
151	Bhitári, VII Daryapur, IX Salun Hill Temple	" 31 33 31 63 12 44	4.680272 4.912160 4.959956	47893 81688 91192	9.071 15.471 17.271	164	Maharájpur, X Chandeva Gujára Hill Fort	h.s. 78 17 45 44 5 17	5.155815 5.007402 5.091529	143158 101719 123461	27.113 19.265 23.383	"
152	Bhitári, VII Chandeva Salun Hill Temple	h.s. 50 36 12 49 49 52	4.917034 4.912160 5.021742	82610 81688 105134	15.646 15.471 19.912	165	Daryapur, IX Maharájpur, X Rágarh Hill Staff	" 25 52 39 24 45 48	4.929816 4.911964 5.178167	85078 81651 150719	16.113 15.464 28.545	"
153	Algi, VIII Chandeva Suru Hill Staff	h.s. 19 44 50 48 25 27	4.524223 4.869419 4.963161	33437 74032 91867	6.333 14.021 17.399	166	Maharájpur, X Majhár, XIV Rágarh Hill Staff	" 47 27 45 51 25 54	4.904054 4.929816 5.031430	80178 85078 107505	15.185 16.113 20.361	"
154	Algi, VIII Chandeva Kamad Fort	h.s. 92 42 55 64 46 19	4.589769 5.006207 4.963161	38884 101440 91867	7.364 19.212 17.399	167	Maharájpur, X Majhár, XIV Geurul Hill Staff	" 49 17 23 23 7 58	4.931876 4.646438 5.031430	85482 44304 107505	16.190 8.391 20.361	"
155	Daryapur, IX Chandeva Kamad Fort	h.s. 75 17 36 43 23 8	4.589769 4.441132 4.547395	38884 27614 35269	7.364 5.230 6.680	168	Maharájpur, X Chandeva Geurul Hill Staff	h.s. 32 20 49 15 24 16	4.950550 4.646438 5.091529	89238 44304 123461	16.901 8.391 23.383	"
156	Algi, VIII Chandeva Datia Palace	h.s. 13 15 31 34 52 54	4.451625 4.848440 4.963161	28289 70541 91867	5.258 13.360 17.399	169	Majhár, XIV Chandeva Deogarh Hill Fort	h.s. 69 46 39 13 33 43	5.155596 4.553364 5.180287	143086 35757 151456	27.100 6.772 28.685	"
157	Algi, VIII Gharabo Datia Palace	h.s. 31 22 42 77 2 10	4.576229 4.848440 4.836826	37690 70541 68679	7.138 13.360 13.007	170	Majhár, XIV Sáwichri, XV Bhandauli	" 25 16 22 132 38 54	4.889448 4.834146 5.125691	77526 68257 133564	14.683 12.927 25.296	"
158	Algi, VIII Chandeva Bharani	h.s. 35 58 5 44 29 54 99 32 1	4.738086 4.814849 4.963161	54712 63290 91867	10.362 12.366 17.399	171	Athgath, XIX Sherpur, XXI Báh	" 34 1 24 106 10 4	4.722951 4.664439 4.899090	52839 46178 79267	10.007 8.746 15.013	12

* Base deduced by two sides and included angle.

SECONDARY TRIANGULATION. TRIANGLES.

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No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	No. of Triangle used	Station	Corrected Plane Angle	Distance			No. of Triangle	No. of Triangle used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles		
172	Sherpur, XXI Bāh Amānpur Temple	s. 9 14 50 56 9 23	3° 07' 02.63 4° 68' 36.33 4° 72' 29.51	9338 48265 52839	1° 769 9° 141 10° 007	181	Inch 12	Jamālpur, XXVII Sahaswān Platform Kādirbāri	14 1 29 152 18 26	4° 72' 23.31 4° 71' 12.63 5° 00' 50.06	52751 51435 101159	9° 991 9° 742 19° 159	18	Inch 18
173	Sherpur, XXI Baragon, XXIII Shikohabad	s. 22 25 43 117 5 56	4° 81' 05.28 4° 57' 9.59 4° 94' 7.26	64644 37998 88660	12° 243 7° 197 16° 792	182	18	Jamālpur, XXVII Kādirbāri Soron House	7 47 23 24 23 55	4° 11' 68.37 4° 60' 08.13 4° 71' 12.63	13087 39885 51435	2° 479 7° 554 9° 742	18	7
174	Sherpur, XXI Shikohabad Batesar House	s. 98 46 51 44 27 27	4° 79' 75.84 4° 64' 80.37 4° 57' 9.59	62746 44467 37998	11° 884 8° 422 7° 197	183	12	Jamālpur, XXVIII Soron House Debrai Fort	32 20 2 77 7 53	4° 34' 00.94 4° 58' 63.00 4° 60' 08.13	21882 38574 39885	4° 144 7° 306 7° 554	18	18
175	Firozabad, XXII Pondri, XXIV Kotla	s. 23 18 58 16 52 29 139 48 33	4° 85' 49.06 4° 72' 02.43 5° 06' 72.11	71599 52510 116738	13° 560 9° 945 22° 109	184	7	Sankrāo, XXVIII Parauli, XXXI Rānghat House	14 13 26 27 14 10	4° 43' 65.32 4° 70' 60.48 4° 86' 70.28	27323 50892 73626	5° 175 9° 639 13° 944	18	18
176	Baragon, XXIII Shikohabad Labhauwa Palace	s. 19 14 39 64 6 40	4° 33' 14.35 4° 76' 75.25 4° 81' 05.28	21450 58550 64644	4° 063 11° 089 12° 243	185	18	Sheopuri, XLVIII Mahesari, LII Bijnor	30 39 45 121 31 21	4° 66' 57.74 4° 70' 43.66 4° 92' 74.74	46321 50625 84620	8° 773 9° 588 16° 027	16	7
177	Baragon, XXIII Kilārmāo, XXV Sakī Temple	s. 8 10 37 13 52 33	4° 62' 88.28 4° 85' 57.17 5° 05' 03.99	42543 71733 112305	8° 057 13° 586 21° 270	186	18	Godhna, XLIX Chāndīpahār, LIV Sūrajpahār	118 8 25 56 25 0	4° 21' 05.60 5° 17' 88.61 5° 15' 41.81	16239 150960 143620	3° 076 28° 591 27° 011	16	7
178	Pondri, XXIV Kilārmāo, XXV Nandauli House	s. 39 39 18 19 51 54	4° 96' 17.44 4° 68' 80.42 5° 09' 22.21	91568 48758 123658	17° 342 9° 234 23° 420	187	18	Chāndīpahār, LIV Sūrajpahār Kankhal Solitary Temple	82 7 45 39 50 38	4° 27' 90.1 4° 08' 86.65 4° 21' 05.60	18963 12265 16239	3° 591 2° 323 3° 076	16	7
179	Salimpur, XXVI Sankrāo, XXVIII Dādo House	s. 17 15 53 29 55 20	4° 59' 11.72 4° 81' 66.75 4° 98' 41.72	39010 65565 96421	7° 388 12° 418 18° 262	188	18	Chāndīpahār, LIV Sūrajpahār Kankhal Temple	56 23 15 40 44 48	4° 13' 44.76 4° 02' 86.59 4° 21' 05.60	13629 10682 16239	2° 581 2° 023 3° 076	16	7
180	Jamālpur, XXVII Sankrāo, XXVIII Sahaswān Platform	s. 33 21 35 53 2 41	4° 84' 26.81 5° 00' 50.06 5° 10' 15.47	69612 101159 126342	13° 184 19° 159 23° 928	189	18	Chāndīpahār, LIV Sūrajpahār Jawālpur House	72 12 13 39 32 13	4° 37' 46.65 4° 38' 54.15 4° 21' 05.60	23695 24289 16239	4° 488 4° 600 3° 076	16	7

NOTE.—Stations Sheopuri, XLVIII, Godhna, XLIX, Mahesari, LII, and Chāndīpahār, LIV appertain to the Great Arc Meridional Series—Sec 24° to 30°.
† Instrument not known.

December 1878.

J. B. N. HENNESSEY,
In charge of Computing Office.

BUDHON MERIDIONAL SERIES:

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL,
 PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
ARMOI, h.s.	o' "	ALGI, VIII	o' "	ANDHIARI, IV	o' "		
Barodia	h.s. 1 28 40	Kamad Fort	s. 241 42 47	Dhandkua, III	256 21 53 29		4
Mandri	" 18 4 54	Bhitari, VII	274 37 19 90	Birari	h.s. 259 15 31		116
Maltaun	" 31 36 55	Iahar Hill Staff	279 32 33	Patna, I	314 31 4 34		4
Patna, I	282 30 56	Jhansi Fort	280 56 32	Bara Dongra Hill Temple	314 57 51		94
		Gwali, V	349 2 5 49	Ero	321 7 57		99
AKBARPUR, XLIV		AMARPUR, h.s.		ATHGATH, XIX			
Sirsa, XL	28 18 1 77	Andhiari, IV	6 21 14	Gurmi, XVII	41 37 49 70		21
Milki, XLIII	88 51 39 68	Ranba Hill Staff	46 15 16	Panahat, XX	104 34 14 17		22
Sarkara, XLV	153 52 46 38	Gurar	h.s. 57 34 33	Bah	s. 126 14 50		171
Nandi, XLVII	210 21 47 83	Gwali, V	233 46 36	Sherpur, XXI	166 3 22 33		23
Bhatauli, XLII	337 26 38 94	Pabba	262 41 3	Bhind, XVIII	342 9 59 35		21
ALGI, VIII		Talapahari	349 6 57	ATORA, XXXIX			
Ghatoli Hill Staff	19 34 26			Bansgopal, XXXV	26 46 8 24		41
Narwar, XI	107 56 28 36	ANDHIARI, IV		Kandarki, XXXVIII	94 45 31 91		41
Raon	h.s. 156 13 42	Gurar	h.s. 157 16 11	Sirsa, XL	159 11 38 43		44
Maharajpur, X	164 42 24 79	Amarpur	" 186 20 4	Bhatauli, XLII	206 4 5 48		45
Bharauni	183 13 56	Gwali, V	" 200 8 19 73	Barauli, XXXVII	325 45 25 43		48
Suru Hill Staff	199 27 11	Jhakaura	" 201 20 54	BAH s.			
Datia Palace	205 56 30	Pabba	" 208 0 37	Amarnpur Temple	143 52 17		172
Chandeva	219 12 1	Kalaphar	" 214 26 52	Sherpur, XXI	200 1 40		171
Daryapur, IX	" 230 58 42 71	Barh	" 239 31 46	Athgath, XIX	306 11 44		171
Gharabo	" 237 19 12						

Name of station with azimuths of surrounding points	No. of triangles running distance	Name of station with azimuths of surrounding points	No. of triangles running distance	Name of station with azimuths of surrounding points	No. of triangles running distance
BANARSA h.s. Pabba Gwáli, V Dhandkúa, III	103 102 102	BHANDAULI s. Sánichri, XV Majhár, XIV	170 170	BIJNOR s. Sheopuri, XLVIII† Mahesari, LIII†	185 185
BANSOPAL, XXXV Rajauli, XXXIII Chandanpur, XXXVI Kandarkí, XXXVIII Atora, XXXIX Barauli, XXXVII Mehtara, XXXIV	38 39 40 41 42 38	BHARAUNI h.s. Algi, VIII Maharajpur, X Chandera	158 159 158	BRARI h.s. Bara Dongra Hill Temple Ero Andhiári, IV Kálapahár	116 117 116 118
BARAGAON, XXIII Sherpur, XXI Shikohabad Labhauwa Palace Firozabad, XXII Pondri, XXIV Kilárnáo, XXV Sakít Temple	25 173 176 25 26 27 177	BHATAULI, XLII Atora, XXXIX Sirsa, XL Akbarpur, XLIV	45 45 46	BUDHON, III* Patna, I Pandúa Samaspur Sagom Tinsmá, VII*	1 62 60 58 1
BARAULI, XXXVII Mehtara, XXXIV Bánsopál, XXXV Atora, XXXIX	42 42 43	BHERO h.s. Lakhanjír Tinsmá, VII* Singan	78 78 79	CHANDANPUR, XXXVI Kandarkí, XXXVIII Bánsopál, XXXV Rajauli, XXXIII	40 39 39
BARH h.s. Andhiári, IV Mohangarh Fort Mora Ratangawan Bijli Dhandkúa, III Bila Hill Staff	106 114 107 112 109 106 110	BRUND, XVIII Jhánkri, XVI Gúrmi, XVII Athgath, XIX	20 20 21	CHANDEVA h.s. Gharabo Algi, VIII Dafia Palace Bharani Suru Hill Staff Ráon Sonáwal Temple Maharajpur, X Genrol Hill Staff Gujiára Hill Fort Majhár, XIV Deogarh Hill Fort Daryapur, IX Salun Hill Temple Bachondono Hill Temple Kamad Fort Bhitári, VII	147 144 156 158 153 161 160 145 168 164 169 169 155 152 150 154 144
BARODIA h.s. Mandri Ahmoi Patna, I Pandúa Samaspur	88 84 80 81 80	BHUTI, VII Sonania Orchha Temple Gwáli, V Sanyer Hill Staff Jhánsi Fort Lahar Hill Staff Algi, VIII Gharabo Chandera Daryapur, IX Salun Hill Temple Bachondono Hill Temple Amra Fort Korar Hill Fort Kathera, VI Mora Barwa Sagar High Tower	132 143 7 138 135 137 8 146 144 9 151 149 148 141 7 105 140	CHANDIPAHAR, LIV† Godhna, XLIX† Kankhal Solitary Temple Jawálapur House Kankhal Temple Súrajpahar	198 187 201 188 186
BENATKA TEMPLE s Jalampur Morári Hill Tree Jagthar Hill Staff	73 75 73	BILI h.s. Dhandkúa, III Barh Mamaun	108 109 108		

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † Of the Great Arc Meridional Series—Section 2° to 30°.

Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance
DARGAWA, II Tinsmál, VII*	2	DHOBAN h.s. Tinsmál, VII*	64	GWALI, V Andhiári, IV	5		
Dhoban	65	Jálampur	71	Talapahári	128		
Lakhanjúr	66	Lakhanjúr	71	Amarpur	120		
Patna, I	2	Patna, I	64	Ghatoli Hill Staff	139		
Sarkaura	95	Dargawa, II	65	Algi, VIII	8		
Dhandkúa, III	3	Ero h.s.		Lahar Hill Staff	187		
Tehri Palace	97	Andhiári, IV	99	Jhansi Fort	135		
Mamaun	96	Kálapahár	119	Sanyer Hill Staff	133		
		Birari	117	Bhitári, VII	7		
		Dhandkúa, III	99	Sonania	131		
DARYAPUR, IX	155			Jiár Hill Staff	126		
Kamad Fort	9			Kathera, VI	6		
Algi, VIII	155			Mora	104		
Chandeva	155			Banarsa	102		
Maharajpur, X	10			Dhandkúa, III	5		
Rámgarh Hill Staff	165			Pabba	101		
Gujára Hill Fort	163						
Majhar, XIV	11						
Anra Fort	148						
Salun Hill Temple	151						
Bachondono Hill Temple	149						
Korar Hill Fort	142						
Bhitári, VII	9						
DEBRAI FORT s.	183						
Soron House	183						
Jamálpur, XXVII							
DHANDKUA, III	8						
Patna, I	93						
Para Dongra Hill Temple	110						
Bila Hill Staff	99						
Ero	4						
Andhiári, IV	106						
Barh	100						
Pabba	5						
Gwali, V	113						
Mohangarh Fort	102						
Banarsa	104						
Mora	111						
Ratangawán	108						
Bijli	6						
Kathera, VI	115						
Majhgawán Hill Staff	96						
Mamaun	98						
Tehri Palace	3						
Dargawa, II	95						
Sarkaura							

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* Of the Great Arc Meridional Series—Section 24° to 30° . † Of the Calcutta Longitudinal Series of the South-East Quadrilateral. ‡ Of the North-East Longitudinal Series.

* Of the Great Arc Meridional Series—Section 24° to 30° .

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
MANDRI h.s. Maltaun Ahmoi Gorur Pandua Barodia	91 89 90 88 88	182 43 30 h.s. " 198 4 11 " 237 39 19 " 260 36 45 " 337 21 13	PANAHAT, XX Firozabad, XXII Sherpur, XXI Athgath, XIX Gurmi, XVII	24 23 22 22	183 4 0 07 241 30 42 16 284 25 9 94 335 46 25 06	RAEPUR, XIII Karua, XII Sanchri, XV Jhankri, XVI Maharajpur, X	15 17 16 12 12
MEHTRA, XXXIV Sakrota, XXX Rajauli, XXXIII Bansgopal, XXXV Barauli, XXXVII Kariamati, XXXII	34 35 38 42 34	29 30 14 39 91 44 50 33 151 38 54 62 210 8 24 59 319 53 7 70	PANDUA h.s. Samaspur Budhon, III* Barodia Mandri Gorur Patna, I Dongra Hill Temple Mahrota Rampura Hill Staff	63 62 81 88 90 62 85 88 87	h.s. 2 39 45 35 12 5 49 51 27 80 39 45 97 5 31 140 46 2 156 5 45 231 0 46 303 38 41	RAJAUULI, XXXIII Parauli, XXXI Chandampur, XXXVI Bansgopal, XXXV Mehtra, XXXIV Sakrota, XXX	37 39 88 35 35
MUK, XLIII Lut, XLI Haldaur, XLVI Sarkara, XLV Akbarpur, XLIV Siree, XL	49 51 50 47 47	29 6 14 71 145 33 25 67 208 31 10 07 268 45 22 83 329 52 8 21	PARAULI, XXXI Rajauli, XXXIII Sakrota, XXX Ranghat House Sankrao, XXVIII	37 36 184 36	196 5 9 12 252 13 5 83 279 28 36 306 42 45 71	RAON h.s. Maharajpur, X Chandeva Algi, VIII	162 161 161
MORA h.s. Dhandkua, III Barh Gwali, V Jhar Hill Staff Bhitari, VII Kathera, VI	104 107 104 126 105 127	14 46 28 h.s. 41 31 20 100 20 7 155 33 38 169 3 1 224 43 6	PATNA, I Barodia Budhon, III* Ahmoi Bara Dongra Hill Temple Andhiari, IV Dongra Hill Temple Dhandkua, III Dargawa, II Mahrota Dhoban Lakhanjhar Tinsmal, VII* Pandua Kali Samaspur Sagoni	80 1 84 93 4 85 3 2 82 64 67 1 62 69 60 59	h.s. 18 17 59 20 6 43 66 102 32 0 133 45 52 134 40 45 12 183 48 50 191 29 31 04 232 13 8 87 254 59 18 281 46 25 292 40 52 301 42 33 71 320 44 49 321 36 54 344 25 3 345 56 36	SAGONI h.s. Budhon, III* Patna, I Samaspur Tinsmal, VII* Sakrota, XXX Sankrao, XXXVIII Parauli, XXXI Rajauli, XXXIII Mehtra, XXXIV Kariamati, XXXII Sarsotha, XXIX	58 59 61 58
NANDI, XLVII Akbarpur, XLIV Sarkara, XLV Harpalsid, XLVIII	53 53 54	30 25 46 01 83 53 57 46 153 7 37 66	PONDRI, XXIV Firozabad, XXII Salimpur, XXVI Nandanli House Kilarmao, XXV Baragaon, XXIII Kotla	26 28 178 27 26 175	2 28 55 44 196 53 12 52 215 9 44 254 49 1 93 308 46 36 39 345 36 26	SALIMPUR, XXVI Pondri, XXIV Dado House Sankrao, XXVIII Jamalpur, XXVII Kilarmao, XXV	28 179 30 29 28
NARWAR, XI Karua, XII Maharajpur, X Algi, VIII	14 13 13	194 46 48 35 225 39 28 46 287 45 14 56	PADMA h.s. Andhiari, IV Jhakra Talaphari Gurur Amarpur Gwali, V Sanyer Hill Staff Ratangawan Banarsa Mohangarh Fort Dhandkua, III	100 125 128 122 121 101 134 111 103 113 100	h.s. 28 6 35 35 40 37 53 37 41 69 40 11 82 45 51 152 49 52 198 53 19 282 45 26 295 5 16 297 47 25 322 58 39	PADMA h.s. Andhiari, IV Jhakra Talaphari Gurur Amarpur Gwali, V Sanyer Hill Staff Ratangawan Banarsa Mohangarh Fort Dhandkua, III	82 36 35 34 33 32
PADMA h.s. Andhiari, IV Jhakra Talaphari Gurur Amarpur Gwali, V Sanyer Hill Staff Ratangawan Banarsa Mohangarh Fort Dhandkua, III	100 125 128 122 121 101 134 111 103 113 100	h.s. 28 6 35 35 40 37 53 37 41 69 40 11 82 45 51 152 49 52 198 53 19 282 45 26 295 5 16 297 47 25 322 58 39	PADMA h.s. Andhiari, IV Jhakra Talaphari Gurur Amarpur Gwali, V Sanyer Hill Staff Ratangawan Banarsa Mohangarh Fort Dhandkua, III	100 125 128 122 121 101 134 111 103 113 100	h.s. 28 6 35 35 40 37 53 37 41 69 40 11 82 45 51 152 49 52 198 53 19 282 45 26 295 5 16 297 47 25 322 58 39	PADMA h.s. Andhiari, IV Jhakra Talaphari Gurur Amarpur Gwali, V Sanyer Hill Staff Ratangawan Banarsa Mohangarh Fort Dhandkua, III	82 36 35 34 33 32

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

AZIMUTHS OF STATIONS AND INTERSECTED POINTS.

27—J.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
SAMASPUR h.s. Patna, I Pandua Rámpura Hill Staff Sagoni	60 63 87 61	SARSOTHA, XXIX Sakrora, XXX Kariámái, XXXII Jamálpur, XXVII	32 83 81	SARSOTHA, XL Bhatauli, XLII Athora, XXXIX	45 44	SIRSA, XL Bhatauli, XLII Athora, XXXIX	45 44
SANTOHRÍ, XV Ráepur, XIII Gúrmí, XVII Jhánkri, XVI Majbár, XIV Bhandauli	17 19 17 18 170	SHEOPUR, XLVIII* Mahesari, LII* Bijnor Haldaur, XLVI	56 185 56	SONANIA h.s. Gwál, V Orehha Temple Bhitári, VII Kathera, VI	131 143 132 131	SONANIA h.s. Gwál, V Orehha Temple Bhitári, VII Kathera, VI	131 143 132 131
SANKRAO, XXVIII Salimpur, XXVI Dádo House Rámghat House Parauli, XXXI Sakrora, XXX Sarsottha, XXIX Sahaswán Platform Jamálpur, XXVII	30 179 184 36 32 31 180 30	SHERPUR, XXI Báh Amánpur Temple Batesar House Panáhat, XX Firozabad, XXII Shikohabad Baragaon, XXIII Athgath, XIX	171 172 174 23 24 173 25 23	SURAJPAHAR h.s. Kankhal Solitary Temple Kankhal Temple Godhna, XLIX* Jawálpur House Chándpahár, LIV*	187 188 186 189 186	SURAJPAHAR h.s. Kankhal Solitary Temple Kankhal Temple Godhna, XLIX* Jawálpur House Chándpahár, LIV*	187 188 186 189 186
SARKARA, XLV Miliik, XLIII Haldaur, XLVI Harpálsid, XLVIII Nandi, XLVII Akbarpur, XLIV	50 51 52 53 50	SHIKOHABAD s. Batesar House Labhauwa Palace Baragaon, XXIII Sherpur, XXI	174 176 173 173	TALAPAHARI h.s. Ranha Hill Staff Amarpur Gwál, V Pabba	130 129 128 128	TALAPAHARI h.s. Ranha Hill Staff Amarpur Gwál, V Pabba	130 129 128 128
SARKARA h.s. Dhandkúa, III Tehri Palace Dargawa, II	95 97 95	SINGAN h.s. Bhero Lakhanjúr Jálampur Tinsmál, VIII†	79 77 76 76	TINSMAL, VII† Jagthar Hill Staff Morári Hill Tree Singan Bhero Budhon, III† Jálampur Sagoni Káli Patna, I Lakhanjúr Dhoban Dargawa, II	72 74 76 78 1 70 58 68 1 66 64 2	TINSMAL, VII† Jagthar Hill Staff Morári Hill Tree Singan Bhero Budhon, III† Jálampur Sagoni Káli Patna, I Lakhanjúr Dhoban Dargawa, II	72 74 76 78 1 70 58 68 1 66 64 2
SARSOTHA, XXIX Sankráo, XXVIII	31	SIRSA, XL Kandarkí, XXXVIII Lát, XL† Miliik, XLIII Akbarpur, XLIV	44 48 47 46	SIRSA, XL Bhatauli, XLII Athora, XXXIX	45 44	SIRSA, XL Bhatauli, XLII Athora, XXXIX	45 44

* Of the Great Arc Meridional Series—Section 24° to 30°. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

January 1879.

J. B. N. HENNESSEY,
In charge of Computing Office.

BUDHON MERIDIONAL SERIES.

CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— λ stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically, H, for the Height when found by spirit leveling, and h for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of λ and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c., secondary stations by the letters h.s. and s. The names in small italics are those of the territories, states or districts in which the stations or points are situated. In a few instances the names of stations are spelt in two ways, those in italics are taken from a list of authorized spellings of names circulated by Government and received subsequently to the printing of the earlier pages of this volume.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Agwānpur s. (Moradabad) On house in fort. λ 28 55 48 L 78 45 56	Amānpur Temple, (Agra) Spire. λ 26 53 44.5 L 78 37 12.2 No. 172	Aran Fort, (Gwalior) Highest turret in village. λ 25 57 6.4 L 77 58 38.1 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.
Ahmoi h.s. (Saugor) About $\frac{1}{2}$ mile N. of village so called. λ 24 20 35.11 L 78 37 1.80 No. 84	Amarpur h.s. (Gwalior) On a quartzose ridge running N.E. and S.W., which consists of two hills connected at their bases. λ 25 4 27.24 L 78 19 6.87 Nos. 120, 121	Ater Temple, (Gwalior) Highest point of spire. λ 26 43 45 L 78 42 9
Akbarpur, XLIV. (Vide page 9—J.) λ 29 4 56.85 L 78 40 50.96 H 719 h 15 No. 46	Amra Fort. (Jhānsi) λ 25 41 14.14 L 78 56 55.25 No. 148	Athgath, XIX. (Vide page 6—J.) λ 26 47 59.51 L 78 45 4.33 H 577 h 36 No. 21
Algi, VIII. (Vide page 4—J.) λ 25 29 46.20 L 78 23 58.16 H 1154 h 0 No. 8	Andhiāri (Andheri), IV. (Vide page 4—J.) λ 24 41 6.77 L 78 16 16.17 H 1630 h Not forthcoming No. 4	Atora, XXXIX. (Vide page 8—J.) λ 28 42 41.94 L 78 39 43.31 H 695.93* h 17.8 Nos. 41, 43

* Refers to the mark-stone let into the upper surface of the pillar.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Awa House Chimney. (Muttra) N. chimney of Rāja's house.</p> <p>λ 27 27 6 L 78 31 47</p> <p>Bachondono Hill Temple. (Jhānsi)</p> <p>λ 25 37 45·1 L 78 50 24·5 Nos. 149, 150</p> <p>Báh s. (Agra) On Patrol Officer's house.</p> <p>λ 26 52 29·77 L 78 38 13·02 No. 171</p> <p>Bámor Peak, (Gwalior) Tree.</p> <p>λ 25 47 22 L 78 4 59 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Banarsa h.s. (Tehri or Orchha) About a mile N. of Mohangarh fort.</p> <p>λ 25 0 11·04 L 78 43 50·42 Nos. 102, 103</p> <p>Bánda Hill Staff. (Gwalior) About ½ mile E. of village so called.</p> <p>λ 26 9 47 L 78 21 23</p> <p>Bánsagopál, XXXV. (Vide page 8—J.)</p> <p>λ 28 33 28·07 L 78 34 26·89 H_s 677† h 19 No. 38</p> <p>Bara Dongra Hill Temple. (Lalitpur)</p> <p>λ 24 26 51·9 L 78 31 50·4 Nos. 93, 94</p> <p>Baragaon, XXIII. (Vide page 6—J.)</p> <p>λ 27 15 2·94 L 78 44 42·45 H_s 573·30† h 45·4 No. 25</p>	<p>Barai Temple s. (Gwalior) Dome spire of hill temple.</p> <p>λ 26 6 13·69 L 78 3 15·22 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Barauli, XXXVII. (Vide page 8—J.)</p> <p>λ 28 32 2·39 L 78 47 56·11 H_s 657* h 16 No. 42</p> <p>Barh h.s. (Lalitpur) On the highest part of a ridge which is the most elevated of three ranges which run in a direction a little E. of N., about 100 feet S. of a conspicuous Math sacred to devi. It is marked on a platform.</p> <p>λ 24 52 30·27 L 78 37 32·47 Nos. 106, 107</p> <p>Barodia h.s. (Saugor) On the eastern bastion of the hill fort.</p> <p>λ 24 12 16·74 L 78 36 47·78 Nos. 80, 81</p> <p>Barodia, N. Turret, (Saugor) Tiled.</p> <p>λ 24 12 53·6 L 78 37 12·9 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Barwa Ságar High Tower. (Jhānsi)</p> <p>λ 25 22 40·1 L 78 46 45·6 No. 140</p> <p>Batesar House. (Agra) Bania's house at E. end of the village.</p> <p>λ 26 56 9·2 L 78 35 6·7 No. 174</p> <p>Belgarh Hill Mark. (Gwalior) About a mile E. of Harsi village.</p> <p>λ 25 46 8 L 77 59 30</p> <p>Benaika Fort, (Saugor) Flag.</p> <p>λ 24 6 34·2 L 78 53 40·5 See Synoptical Vol. of the Calcutta Longl. Series.</p>	<p>Benaika Temple s. (Saugor)</p> <p>λ 24 6 34·27 L 78 53 42·34 No. 73</p> <p>Bhandauli s. (Gwalior) On the highest house in fort.</p> <p>λ 26 11 15·10 L 78 19 32·54 No. 170</p> <p>Bharauni h.s. (Datia) About a mile S. of fort.</p> <p>λ 25 40 31·93 L 78 24 38·40 Nos. 158, 159</p> <p>Bhatauli, XLII. (Vide page 9—J.)</p> <p>λ 28 54 0·60 L 78 46 0·69 H_s 689·37§ h 14·5 No. 45</p> <p>Bhero h.s. (Saugor) About ¼ mile S. of Sagaria village.</p> <p>λ 24 4 37·58 L 78 43 46·89 Nos. 78, 79</p> <p>Bhind, XVIII. (Vide page 6—J.)</p> <p>λ 26 33 32·92 L 78 50 14·33 H 562 h 5¶ No. 20</p> <p>Bhitári, VII. (Vide page 4—J.)</p> <p>λ 25 28 4·54 L 78 46 39·51 H 1055 h 0 No. 7</p> <p>Bijli h.s. (Lalitpur) On a detached hill, about 2 miles S.W. of Kelgong fort.</p> <p>λ 24 49 19·54 L 78 46 31·60 Nos. 108, 109</p>

† Refers to the upper surface of the masonry pillar. ‡ Refers to the mark-stone imbedded at 1 foot below the ground floor of the tower. * Refers to the upper surface of brick-work of the tower. § Refers to the upper mark-stone and was determined as follows:—the point leveled to was at the base of the tower of which the height = 673·88 feet and to this was added 15·49 feet (the height of upper mark-stone above that point obtained by subense observations). ¶ Above roof of gateway on which the pillar stands.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Bijnor s. (<i>Bijnor</i>) On centre chimney of Collector's house.</p> <p>λ 29 22 41.52 L 78 10 31.27 No. 185</p> <p>Bila Hill Staff. (<i>Lalitpur</i>) On a detached hill, about 4 miles W. of Kua village and 1½ miles W. of a Nadi.</p> <p>λ 24 44 27.69 L 78 41 3.89 No. 110</p> <p>Birári h.s. (<i>Lalitpur</i>) On an isolated red stone hill lying between Barh and Ero and between Dhandkúa and Sirsod. The hill is rugged and of difficult ascent.</p> <p>λ 24 43 56.58 L 78 32 41.51 Nos. 116, 117</p> <p>Bitarwár Fort, (<i>Gwalior</i>) Central white dome.</p> <p>λ 25 47 20 L 78 9 8 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Budhon, III*. (<i>Vide page 3—J.</i>)</p> <p>λ 24 5 8.41 L 78 33 39.07 H 1867 h 9 No. 1</p> <p>Chandanpur, XXXVI. (<i>Vide page 8—J.</i>)</p> <p>λ 28 33 58.94 L 78 20 59.24 H 647 h 16 No. 39</p> <p>Chandeva h.s. (<i>Datia</i>) On a quartzose ridge running north and south, and derives its name from an ancient well, called Chandeva-ka-Báoli, situated about 50 yards east of the station. Marked by a circle and dot engraved on rock in the centre of a platform. The high road from Datia to Kálpí runs at the southern foot of the hill. The village of Bahádurpur lies at the N.E. extremity of the ridge and about ¼ mile from the station.</p> <p>λ 25 41 31.04 L 78 34 32.96 H 909 h 0 Nos. 144, 145</p>	<p>Chándipahár, LIV. (<i>Bijnor</i>) Hill station is situated on the highest part of the hill facing the town of Hardwár, a noted place of Hindu pilgrimage; in thána Nágal, tahsíl Najíbabad, district Bijnor. On a peak about half a mile north of the station stands a conspicuous Hindu temple. The river Ganges flows to the W. of the station, at a distance of about a mile. Marked by a solid platform having mark-stones at top and bottom.</p> <p>λ 29 55 29.73 L 78 13 37.13 H 1913 h 6 No. 79 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Chándipahár Hill Temple, (<i>Bijnor</i>) Spire.</p> <p>λ 29 56 1 L 78 13 20</p> <p>Chinúr Hill Fort, (<i>Gwalior</i>) White circular turret W. end.</p> <p>λ 25 56 42.4 L 78 8 31.8 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Dádo House. (<i>Aligarh</i>) Chimney of zamíndár's house.</p> <p>λ 27 57 8.3 L 78 30 27.6 No. 179</p> <p>Dargawa, II. (<i>Vide page 4—J.</i>)</p> <p>λ 24 37 13.21 L 79 3 51.81 H 1452 h 0 No. 2</p> <p>Daryapur, IX. (<i>Vide page 5—J.</i>)</p> <p>λ 25 42 12.41 L 78 40 55.86 H 793 h Not forthcoming No. 9</p> <p>Datia Palace. (<i>Datia</i>) Steeple of a large and conspicuous building called Rájgarh which consists of four or five stories surmounted by a dome.</p> <p>λ 25 40 14.5 L 78 29 35.5 Nos. 156, 157</p>	<p>Debrai Fort s. (<i>Etah</i>) On the S.W. tower of old fort.</p> <p>λ 27 50 37.35 L 78 44 58.29 No. 183</p> <p>Deogarh Hill Fort. (<i>Gwalior</i>) On a flat-topped hill of sandstone detached from the main range and consisting of a wall flanked by tower bastions around the outer edge of the hill.</p> <p>λ 26 5 1 L 78 37 8 No. 169</p> <p>Dhandkúa, III. (<i>Vide page 4—J.</i>)</p> <p>λ 24 47 35.33 L 78 45 44.02 H 1291 h Not forthcoming No. 3</p> <p>Dhoban h.s. (<i>Saugor</i>) About a mile N.W. of Dulchipur fort.</p> <p>λ 24 15 40.54 L 79 2 24.54 Nos. 64, 65</p> <p>Dholpahári h.s. (<i>Saugor</i>) About 1½ miles E. of Túru village.</p> <p>λ 23 58 41.28 L 78 57 42.04 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Dongra Hill Temple. (<i>Lalitpur</i>)</p> <p>λ 24 22 29.5 L 78 39 46.8 Nos. 85, 86</p> <p>Dugáo Fort, (<i>Saugor</i>) N.W. angle of a high square building.</p> <p>λ 24 9 39.6 L 78 27 56.3 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Ero h.s. (<i>Lalitpur</i>) On a flat-topped hill near village of the same name. The hill is rugged and of difficult ascent.</p> <p>λ 24 33 26.36 L 78 23 1.77 No. 99</p> <p>Ferozpur (<i>Firozpur</i>) s. (<i>Muzaffarnagar</i>) On the roof of a building about 25 feet high in village so called, ¼ mile S. of the Ganges, and 2 miles N.E. of Bhúkarheri town.</p> <p>λ 29 30 6.27 L 78 1 0.80 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Firozabad, XXII. (<i>Vide page 6—J.</i>)</p> <p>λ 27 8 37.46 L 78 25 56.23 H_s 557.44* h 43.8† No. 24</p> <p>Genrol Hill Staff. (<i>Gwalior</i>) On hill at the W. foot of which is the village so called.</p> <p>λ 25 53 15.77 L 78 24 43.57 Nos. 167, 168</p> <p>Gharabo h.s. (<i>Datia</i>) Close to village so called and about 1½ miles S. of Sersa village.</p> <p>λ 25 35 53.17 L 78 34 29.67 Nos. 146, 147</p> <p>Ghatoli Hill Staff. (<i>Gwalior</i>) About a mile from the villages of Gatabara and Lidhaura which are situated respectively on the E. and W. sides of the hill.</p> <p>λ 25 14 58.60 L 78 18 11.15 No. 189</p> <p>Godhna, XLIX. (<i>Muzaffarnagar</i>) Tower Station is built on the high bank which bounds the bed of the Ganges to the west, and is distant about ¼ of a mile to the east of the village from which its name is derived; in pargana Pūr Chhapār, tahsil Muzaffarnagar. The village of Kāzīkūpur is about 4 miles to W. and that of Thugalpur 1½ miles to S. Marked by a hollow tower having a mark-stone in the ground floor.</p> <p>λ 29 37 18.46 L 77 56 30.16 H 901 h 51 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Gorar h.s. (<i>Saugor</i>) On the northern extremity of a detached hill, about a mile W. of Derli village.</p> <p>λ 24 17 15.24 L 78.38 3.15 No. 90</p> <p>Gujāra Hill Fort. (<i>Gwalior</i>)</p> <p>λ 26 4 54 L 78 30 43 Nos. 163, 164</p>	<p>Gurar h.s. (<i>Gwalior</i>) On the high peak which overlooks the village so called. Marked by a platform erected in rear of a sandstone building in which are placed the figures of Hindu gods and goddesses.</p> <p>λ 24 58 14.51 L 78 8 23.74 Nos. 122, 123</p> <p>Gūrmi, XVII. (<i>Vide page 5—J.</i>)</p> <p>λ 26 36 3.63 L 78 33 17.00 H 575 h 27† No. 19</p> <p>Gwāli, V. (<i>Vide page 4—J.</i>)</p> <p>λ 25 10 25.82 L 78 28 5.22 H 1209 h Not forthcoming No. 5</p> <p>Gwalior Hill Temple, (<i>Gwalior</i>) At southern end of fort.</p> <p>λ 26 13 12.3 L 78 12 28.2 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Haldaur, XLVI. (<i>Vide page 9—J.</i>)</p> <p>λ 29 16 41.23 L 78 18 33.28 H 806 h 20 No. 51</p> <p>Harpālsid, XLVIII. (<i>Vide page 9—J.</i>)</p> <p>λ 29 39 50.90 L 78 35 47.99 H 2876 h 0 Nos. 52, 54</p> <p>Hill θ. (<i>Dehra Dūn</i>) On the Siwālik hills, about ½ mile W. of Kharkhari village.</p> <p>λ 29 57 58.1 L 78 12 26.9 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>	<p>Himmatgarh Hill Fort Building. (<i>Gwalior</i>) S. Staircase of a square building.</p> <p>λ 26 3 5.3 L 78 5 24.9 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Himmatgarh Hill Fort Gate. (<i>Gwalior</i>) Cupola over eastern gate.</p> <p>λ 26 3 3.2 L 78 5 25.4 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Himmatgarh Peak, (<i>Gwalior</i>) Pointed Stone, W. of fort.</p> <p>λ 26 2 32.2 L 78 4 30.0 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Jagthar Hill Staff. (<i>Saugor</i>) About 2 miles W. of Pathari village.</p> <p>λ 24 4 38.31 L 78 58 45.28 No. 72</p> <p>Jajādeo Hill Temple, (<i>Gwalior</i>) Square.</p> <p>λ 25 43 17.3 L 77 57 15.2 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Jālampur h.s. (<i>Saugor</i>) About a mile N. of Ratanpur village.</p> <p>λ 24 7 7.20 L 78 57 27.66 Nos. 70, 71</p> <p>Jalesar s. (<i>Muttra</i>) On S.W. corner of Tahsil dār's Kachahri.</p> <p>λ 27 28 16 L 78 20 52</p> <p>Jalesar Temple. (<i>Muttra</i>) Old temple E. of Jalesar.</p> <p>λ 27 28 9 L 78 21 32</p> <p>Jamālpur, XXVII. (<i>Vide page 7—J.</i>)</p> <p>λ 27 48 10.77 L 78 51 35.08 H 599 h 28 No. 29</p>

* Refers to the mark-stone imbedded at 1 foot below the level of the terreplein of the rampart on which the tower is built. † Above the terreplein of the rampart on which the tower stands.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Jawālapur House s. <i>(Sahāranpur)</i> On Bania's high paka house, marked with an iron spike. λ 29 55 26.87 L 78 9 1.09 Nos. 189	Kālapahār h.s. <i>(Lalitpur)</i> On one of a group of detached hills of moderate elevation covered with dense jungle and of not very steep ascent. λ 24 44 59.30 L 78 19 10.86 Nos. 118, 119	Kasar Fort s. <i>(Aligarh)</i> On N.E. tower of old fort. λ 27 55 11 L 78 33 47
Jawālapur s. <i>(Sahāranpur)</i> λ 29 55 8.60 L 78 9 53.40 H 932 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.	Kāli h.s. <i>(Saugor)</i> About 2 miles S. of Dhamoni fort. λ 24 10 28.15 L 78 47 52.96 Nos. 68, 69	Kathera, VI. <i>(Vide page 4—J.)</i> λ 25 14 20.91 L 78 59 39.05 H 1349 h Not forthcoming No. 6
Jerila Temple. <i>(Agra)</i> Spire of high temple. λ 27 19 32 L 78 30 12	Kamad Fort s. <i>(Datia)</i> On S.W. bastion of fort. λ 25 37 41.49 L 78 40 14.24 Nos. 154, 155	Kilārmāo, XXV. <i>(Vide page 7—J.)</i> λ 27 33 11.44 L 78 48 58.27 H 605 h 44 No. 27
Jhakaura h.s. <i>(Lalitpur)</i> On a hill of quartzose structure, running E. and W., about $\frac{1}{2}$ mile N.W. of village so called. This hill, though of moderate elevation, has a good command of the surrounding country. λ 24 55 4.28 L 78 22 15.18 Nos. 124, 125	Kandarki, XXXVIII. <i>(Vide page 8—J.)</i> λ 28 43 37.17 L 78 27 2.57 H 689 h 19 No. 40	Kimlāsa Pagoda. <i>(Saugor)</i> λ 24 12 21.2 L 78 24 24.9 See Synoptical Vol. of the Calcutta Longitudinal Series.
Jhānkri, XVI. <i>(Vide page 5—J.)</i> λ 26 18 53.92 L 78 34 41.30 H 624 h Not forthcoming No. 16	Kankhal Solitary Temple, <i>(Sahāranpur)</i> Spire, in the bed of the Ganges river, S. of town. λ 29 54 59.2 L 78 11 22.2 No. 187	Korār Hill Fort, <i>(Tehri or Orchha)</i> Southern highest building. λ 25 28 50.9 L 78 56 26.6 Nos. 141, 142
Jhānsi Fort, <i>(Gwalior)</i> Flag. λ 25 27 27.6 L 78 37 4.8 Nos. 135, 136	Kankhal Temple, <i>(Sahāranpur)</i> Northernmost, on bank of the Ganges river near Bhāramal's garden. λ 29 55 50.3 L 78 11 38.0 No. 188	Kotla s. <i>(Agra)</i> On gateway of Raja's palace. λ 27 16 25.63 L 78 30 9.45 No. 175
Jiār Hill Staff. <i>(Jhānsi)</i> On a detached hill on E. side of which lies the village so called. λ 25 14 20.23 L 78 47 22.49 Nos. 126, 127	Karaia, XII. <i>(Vide page 5—J.)</i> λ 25 53 47.07 L 78 2 43.76 H 1287 h Not forthcoming No. 14	Labhauwa Palace. <i>(Mainpuri)</i> Small turret on the S.E. angle of the building. λ 27 9 12.2 L 78 36 6.1 No. 176
Kādirbāri s. <i>(Etah)</i> On a platform, with centre-mark, on a high mound W. of the village. λ 27 55 43.38 L 78 47 12.17 No. 181	Kariāmāi, XXXII. <i>(Vide page 7—J.)</i> λ 28 15 7.44 L 78 48 1.99 H 624 h 17 No. 33	Lachmangarh Hill Fort. <i>(Gwalior)</i> Staircase of southernmost building. λ 25 47 40.7 L 78 9 23.6 See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Ladára h.s. (<i>Gwalior</i>) On N.E. extremity of sandstone hills 2 miles S.E. of Narwar town; denoted by a circular platform which has the usual mark-stone on its surface.</p> <p>λ 25 37 22·25 L 77 57 56·67</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>	<p>Mahrora s. (<i>Lalitpur</i>) On Kamal bastion of Márogarh fort in town.</p> <p>λ 24 22 47·15 L 78 50 43·31 Nos. 82, 83</p>	<p>Milik, XLIII. (<i>Vide page 9—J.</i>)</p> <p>λ 29 4 42·70 L 78 27 55·61 H 742 h 17 Nos. 47, 49</p>
<p>Ladára Hill Tomb, (<i>Gwalior</i>) Eastern.</p> <p>λ 25 37 48·7 L 77 57 23·9</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>	<p>Majhár, XIV. (<i>Vide page 5—J.</i>)</p> <p>λ 26 6 17·00 L 78 30 44·91 H 1028 h Not forthcoming No. 11</p>	<p>Mohangarh Fort. (<i>Tehri or Orchha</i>) Highest point in fort which consists of a paka wall with bastions running along the ridge.</p> <p>λ 24 59 42·88 L 78 43 21·04 Nos. 113, 114</p>
<p>Lahar Hill Staff. (<i>Gwalior</i>) On a detached hill about a mile N. of village so called.</p> <p>λ 25 28 0·94 L 78 35 25·21 Nos. 137, 138</p>	<p>Majhgawán Hill Staff. (<i>Tehri or Orchha</i>) Near Kandi village and about ½ a mile from the right bank of Jamni river.</p> <p>λ 24 50 7·22 L 78 50 15·44 No. 116</p>	<p>Mora h.s. (<i>Tehri or Orchha</i>) About a mile W. of Mora village.</p> <p>λ 25 6 37·18 L 78 51 13·89 Nos. 104, 105</p>
<p>Lakhanjhír h.s. (<i>Lalitpur</i>) About 1½ miles E. of Papro village.</p> <p>λ 24 14 35·34 L 78 53 51·38 Nos. 66, 67</p>	<p>Maltaun h.s. (<i>Saugor</i>) On a detached hill about a mile S.E. of fort so called.</p> <p>λ 24 18 9·42 L 78 35 23·94 Nos. 91, 92</p>	<p>Moradabad s. (<i>Moradabad</i>) On Collector's Kachahri.</p> <p>λ 28 51 6 L 78 48 35</p>
<p>Lút, XLI. (<i>Vide page 9—J.</i>)</p> <p>λ 28 53 42·23 L 78 20 57·91 H 716 h 20 No. 48</p>	<p>Mamaun h.s. (<i>Tehri or Orchha</i>) About 1½ miles E. of the town of Tehri.</p> <p>λ 24 44 45·44 L 78 54 45·72 No. 96</p>	<p>Morári Hill Tree. (<i>Saugor</i>) Large tamarind tree.</p> <p>λ 24 6 16 L 79 0 3 Nos. 74, 75</p>
<p>Mábegarh, I.* (<i>Vide page 9—J.</i>)</p> <p>λ 29 52 39·58 L 78 29 52·03 H 5652 h 7 No. 57</p>	<p>Mandri h.s. (<i>Saugor</i>) About 2 miles W. of Palaitna village.</p> <p>λ 24 15 38·30 L 78 35 16·09 Nos. 88, 89</p>	<p>Náh House Chimney, (<i>Aligarh</i>) Of Zamindár's house.</p> <p>λ 27 58 35 L 78 34 19</p>
<p>Maharájpur, X. (<i>Vide page 5—J.</i>)</p> <p>λ 25 53 54·44 L 78 16 40·27 H 1015 h Not forthcoming No. 10</p>	<p>Mangára Building, (<i>Gwalior</i>) S.W. corner.</p> <p>λ 26 5 25·5 L 78 5 38·2</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>	<p>Nandauli House. (<i>Etah</i>) Staircase of Bania's house.</p> <p>λ 27 34 27·1 L 78 32 4·3 No. 178</p>
<p>Mahesari, LII.† (<i>Vide page 10—J.</i>)</p> <p>λ 29 30 18·21 L 78 11 18·88 H 821 h 14 No. 55</p>	<p>Mehtra, XXXIV.. (<i>Vide page 8—J.</i>)</p> <p>λ 28 22 5·99 L 78 41 23·88 H 652½ h 16 No. 34</p>	<p>Nandi, XLVII. (<i>Vide page 9—J.</i>)</p> <p>λ 29 17 7·53 L 78 48 59·41 H 771 h 12 No. 53</p>
		<p>Nandrae Temple. (<i>Etah</i>) Spire of large temple.</p> <p>λ 27 46 53 L 78 39 37</p>

* Of the North-East Longitudinal Series.

† Of the Great Arc Series—Section 24° to 30°.

‡ Refers to the upper surface of brick-work of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Narki s. (Agra) On small pillar on Raja's house.</p> <p>λ 27 17 42 L 78 26 47</p> <p>Narwar, XI. (Vide page 5—J.)</p> <p>λ 25 37 22.30 L 77 57 56.47 H 1489 h Not forthcoming No. 13</p> <p>Narwar Fort, (Gwalior) N. gateway of inner fort.</p> <p>λ 25 39 2.9 L 77 56 56.5</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Orchha Temple. (Tehri or Orchha)</p> <p>λ 25 20 59.0 L 78 40 54.7 No. 143</p> <p>Pabha h.s. (Lalitpur) On a quartzose ridge running N.E. and S.W.</p> <p>λ 25 5 48.06 L 78 30 41.87 Nos. 100, 101</p> <p>Painári Temple, (Saugor) On hill.</p> <p>λ 24 1 20.4 L 78 54 58.2</p> <p>See Synoptical Vol. of the Calcutta Longitudinal Series.</p> <p>Panáhat, XX. (Vide page 6—J.)</p> <p>λ 26 52 39.07 L 78 24 58.83 H 588 h 30 No. 22</p> <p>Pandúa h.s. (Lalitpur) Also called Sakáto h.s. About 1½ miles N. of Pectoria village.</p> <p>λ 24 16 44.45 L 78 42 33.75 Nos. 62, 63</p>	<p>Paniári Building. (Gwalior) Cupola of a square building surmounted by a dome.</p> <p>λ 26 6 13.8 L 78 4 31.1</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Paniári Village Building, (Gwalior) S. gate.</p> <p>λ 26 5 55 L 78 4 18</p> <p>Parauli, XXXI. (Vide page 7—J.)</p> <p>λ 28 9 45.27 L 78 23 31.39 H 643 h 19 No. 36</p> <p>Pátan Temple. (Saugor)</p> <p>λ 24 7 27.7 L 78 54 47.0</p> <p>See Synoptical Vol. of the Calcutta Longitudinal Series.</p> <p>Patna, I. (Vide page 4—J.)</p> <p>λ 24 20 3.70 L 78 39 36.15 H 1823 h Not forthcoming No. 1</p> <p>Pindarua Fort, (Saugor) Flag.</p> <p>λ 24 6 22.8 L 78 44 52.5</p> <p>See Synoptical Vol. of the Calcutta Longitudinal Series.</p> <p>Pondri, XXIV. (Vide page 6—J.)</p> <p>λ 27 27 52.48 L 78 26 52.19 H_s 594.75* h 44.3 No. 26</p> <p>Ráepur (Raepur), XIII. (Vide page 5—J.)</p> <p>λ 26 8 14.29 L 78 7 16.15 H 1219 h Not forthcoming Nos. 12, 15</p>	<p>Ráipur (Raepur) Building, (Gwalior) Northernmost, in village.</p> <p>λ 25 44 12 L 77 34 35</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Ráipur (Raepur) Peak Temple. (Gwalior) Dome of square temple.</p> <p>λ 26 8 16.4 L 78 7 16.8</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Ráipur (Raepur) Temple. (Gwalior) In village.</p> <p>λ 26 7 51.2 L 78 5 51.8</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Rajauli, XXXIII. (Vide page 8—J.)</p> <p>λ 28 22 27.53 L 78 27 39.95 H 629 h 23 Nos. 35, 37</p> <p>Rámgarh Hill Staff. (Datia) On a quartz high ridge near the village so called.</p> <p>λ 25 53 6.59 L 78 32 10.49 Nos. 165, 166</p> <p>Rámghat House. (Bulandshahr) Bania's house at W. end of village.</p> <p>λ 28 5 42.2 L 78 25 45.4 No. 184</p> <p>Rámpura Hill Staff. (Saugor) Near Rampur village.</p> <p>λ 24 13 35.97 L 78 47 42.45 No. 87</p> <p>Ranha Hill Staff. (Gwalior)</p> <p>λ 24 59 37.25 L 78 13 34.53 No. 130</p> <p>Ráon h.s. (Gwalior) On a high ridge of the dark quartzose formation, about two miles from the village and fort of Belhári. It is the highest hill in that direction. Close to the Ráon hill to the W. runs the Non river, a tributary of the Sindh.</p> <p>λ 25 41 48.89 L 78 18 6.76 Nos. 161, 162</p>

* Refers to the mark-stone imbedded at 1 foot below the ground floor of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Ratangawán h.s. <i>(Tehri or Orchha)</i> About a mile W. of village so called. <div style="text-align: right;">o ' "</div> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 25 1 38·71</div> <div style="text-align: right;">L 78 50 44·07</div> </div> <div style="text-align: right;">Nos. 111, 112</div>	Sánichri (<i>Saníchari</i>), XV. <i>(Vide page 5—J.)</i> <div style="text-align: right;">o ' "</div> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 26 23 31·20</div> <div style="text-align: right;">L 78 15 30·00</div> <div style="text-align: right;">H 825</div> <div style="text-align: right;">h Not forthcoming</div> </div> <div style="text-align: right;">Nos. 17, 18</div>	Shikohabad s. <i>(Mainpuri)</i> On staircase of gateway on the Agra road, S. end of town. <div style="text-align: right;">o ' "</div> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 27 6 9·32</div> <div style="text-align: right;">L 78 38 6·93</div> </div> <div style="text-align: right;">No. 173</div>
Ronda Fort, <i>(Saugor)</i> S.W. angle. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 24 10 36·3</div> <div style="text-align: right;">L 78 32 39·7</div> </div> <div style="text-align: right;">See Synoptical Volume of the Calcutta Longl. Series.</div>	Sankráo, XXVIII. <i>(Vide page 7—J.)</i> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 28 2 28·99</div> <div style="text-align: right;">L 78 34 30·15</div> <div style="text-align: right;">H 670</div> <div style="text-align: right;">h 37</div> </div> <div style="text-align: right;">No. 30</div>	Singan h.s. <i>(Saugor)</i> About 2 miles E. of Pitauli village. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 24 1 33·53</div> <div style="text-align: right;">L 78 47 0·90</div> </div> <div style="text-align: right;">Nos. 76, 77</div>
Sagoni h.s. <i>(Saugor)</i> About 1½ miles E. of Tágar village. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 24 7 42·60</div> <div style="text-align: right;">L 78 42 58·34</div> </div> <div style="text-align: right;">Nos. 58, 59</div>	Sanyer Hill Staff. <i>(Jhānsi)</i> About 5 miles W. of the town of Orchha. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 25 21 12·80</div> <div style="text-align: right;">L 78 36 30·21</div> </div> <div style="text-align: right;">Nos. 133, 134</div>	Sirsa, XL. <i>(Vide page 8—J.)</i> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 28 54 39·64</div> <div style="text-align: right;">L 78 34 33·32</div> <div style="text-align: right;">H 739·45†</div> <div style="text-align: right;">h 26·0</div> </div> <div style="text-align: right;">No. 44</div>
Sahaswán Platform. <i>(Budaun)</i> On a high mound N. of village. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 28 4 25·7</div> <div style="text-align: right;">L 78 47 16·0</div> </div> <div style="text-align: right;">No. 180</div>	Sarkára, XLV. <i>(Vide page 9—J.)</i> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 29 15 46·92</div> <div style="text-align: right;">L 78 34 47·36</div> <div style="text-align: right;">H 761</div> <div style="text-align: right;">h 16</div> </div> <div style="text-align: right;">No. 50</div>	Sonania h.s. <i>(Tehri or Orchha)</i> On a detached hill near village so called. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 25 20 2·19</div> <div style="text-align: right;">L 78 44 56·30</div> </div> <div style="text-align: right;">Nos. 131, 132</div>
Sakít Temple. <i>(Etah)</i> Spire of highest temple. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 27 26 10·4</div> <div style="text-align: right;">L 78 49 14·9</div> </div> <div style="text-align: right;">No. 177</div>	Sarkaura h.s. <i>(Lalitpur)</i> On a detached hill near village so called. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 24 34 13·34</div> <div style="text-align: right;">L 78 56 43·22</div> </div> <div style="text-align: right;">No. 95</div>	Sonáwal Temple. <i>(Dalia)</i> On a sandstone hill so called. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 25 43 3·9</div> <div style="text-align: right;">L 78 24 54·8</div> </div> <div style="text-align: right;">No. 160</div>
Sakrora, XXX. <i>(Vide page 7—J.)</i> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 28 13 12·59</div> <div style="text-align: right;">L 78 35 43·17</div> <div style="text-align: right;">H 613</div> <div style="text-align: right;">h 21</div> </div> <div style="text-align: right;">No. 32</div>	Sarsotha, XXIX. <i>(Vide page 7—J.)</i> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 28 5 59·88</div> <div style="text-align: right;">L 78 47 40·39</div> <div style="text-align: right;">H 606</div> <div style="text-align: right;">h 24</div> </div> <div style="text-align: right;">No. 31</div>	Soron House. <i>(Etah)</i> Bania's high house. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 27 53 34·0</div> <div style="text-align: right;">L 78 47 19·6</div> </div> <div style="text-align: right;">No. 182</div>
Salámpur, XXVI. <i>(Vide page 7—J.)</i> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 27 46 36·46</div> <div style="text-align: right;">L 78 33 15·88</div> <div style="text-align: right;">H 645</div> <div style="text-align: right;">h 48</div> </div> <div style="text-align: right;">No. 28</div>	Sheopuri, XLVIII*. <i>(Vide page 10—J.)</i> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 29 18 59·08</div> <div style="text-align: right;">L 78 1 58·60</div> <div style="text-align: right;">H 871</div> <div style="text-align: right;">h 41</div> </div> <div style="text-align: right;">No. 56</div>	Súrajpahár h.s. <i>(Dehra Dún)</i> On the highest point of the hill. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 29 57 58·35</div> <div style="text-align: right;">L 78 12 26·76</div> </div> <div style="text-align: right;">No. 186</div>
Salun Hill Temple. <i>(Jhānsi)</i> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 25 41 17·8</div> <div style="text-align: right;">L 78 49 36·0</div> </div> <div style="text-align: right;">Nos. 151, 152</div>	Sherpur, XXI. <i>(Vide page 6—J.)</i> <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 27 0 41·38</div> <div style="text-align: right;">L 78 41 33·12</div> <div style="text-align: right;">H 578</div> <div style="text-align: right;">h 31†</div> </div> <div style="text-align: right;">No. 23</div>	Súrajpur Building, <i>(Gwalior)</i> Square, E. end of S. wall. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 25 58 19·6</div> <div style="text-align: right;">L 78 4 25·4</div> </div> <div style="text-align: right;">See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</div>
Samaspur h.s. <i>(Saugor)</i> Near Sanjra village. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 24 11 14·54</div> <div style="text-align: right;">L 78 42 17·02</div> </div> <div style="text-align: right;">Nos. 60, 61</div>		Suru Hill Staff. <i>(Dalia)</i> About 1½ miles N.W. of the town of Dalia. <div style="display: flex; justify-content: flex-end;"> <div style="text-align: right;">λ 25 41 17·62</div> <div style="text-align: right;">L 78 28 27·71</div> </div> <div style="text-align: right;">No. 153</div>

* Of the Great Arc Series—Section 24° to 30°. † Above the terreplein of the rampart on which the tower stands. ‡ Refers to the upper mark-stone of the tower and was determined as follows. The point leveled to was at the base of the tower of which the height = 715·22 feet and to this was added 24·23 feet (the height of upper mark-stone above that point obtained by subtense observations).

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Talapahári h.s. (<i>Gwahior</i>) On the highest of the group of Talapahár hills which is of moderate elevation and of sandstone structure. The station lies about $\frac{1}{2}$ a mile off from the village of that name. The Betwanti flows through these hills.</p> <p style="text-align: center;">° ' "</p> <p>λ 24 58 49·05 L 78 20 18·21 Nos. 128, 129</p>	<p>Tehri Palace. (<i>Tehri or Orohha</i>) Flagstaff on palace in fort.</p> <p style="text-align: center;">° ' "</p> <p>λ 24 44 32·8 L 78 52 37·7 Nos. 97, 98</p>	<p>Tinsmál, VII*. (<i>Vide page 4—J.</i>)</p> <p style="text-align: center;">° ' "</p> <p>λ 24 7 12·97 L 79 2 12·45 H 2139 h 9 No. 1</p>

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

February 1879.

J. B. N. HENNESSEY,
In charge of Computing Office.

List of Published Works of the Great Trigonometrical Survey of India.

An Account of the Measurement of an Arc of the meridian between the parallels of $18^{\circ} 3'$ and $24^{\circ} 7'$, being a continuation of the Grand Meridional Arc of India as detailed by the late Lieutenant-Colonel Lambton in the Volumes of the Asiatic Society of Calcutta. By Captain George Everest, of the Bengal Artillery, F.R.S., &c. London, 1830.

An Account of the Measurement of two Sections of the Meridional Arc of India, bounded by the parallels of $18^{\circ} 3' 5''$; $24^{\circ} 7' 11''$; and $29^{\circ} 30' 18''$. By Lieutenant-Colonel Everest, F.R.S., &c., late Surveyor General of India, and his Assistants. London, 1847.

Account of the Operations of the Great Trigonometrical Survey of India.

- Volume I. The Standards of Measure and the Base-Lines, also an Introductory Account of the early Operations of the Survey, during the period of 1800-1830. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey. Dehra Dún, 1870.
- Do. II. History and General Description of the Principal Triangulation and of its Reduction. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.
- Do. III. The Principal Triangulation, the Base-Line Figures, the Karáchi Longitudinal, N.W. Himalaya, and Great Indus Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1873.
- Do. IV. The Principal Triangulation, the Great Arc (Section 24° - 30°), Rahún, Gurhágárh and Jogí-Tíla Meridional Series, and the Sutlej Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1876.
- Do. V. Details of the Pendulum Operations by Captains J. P. Basevi, R.E., and W. J. Heaviside, R.E., and of their Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún and Calcutta, 1879.
- Do. VI. The Principal Triangulation of the South-East Quadrilateral including the Great Arc—Section 18° to 24° , the East Coast Series, the Calcutta and the Bider Longitudinal Series, the Jabalpur and the Biláspur Meridional Series, and the Details of their Simultaneous Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1880.
- Do. VII. General Description of the Principal Triangulation of the North-East Quadrilateral including the Simultaneous Reduction and the Details of Five of the Component Series, the North-East Longitudinal, the Budhon Meridional, the Rangír Meridional, the Amua Meridional, and the Karára Meridional. Prepared under the directions of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
- Do. VIII. Details of the Principal Triangulation of Eleven of the Component Series of the North-East Quadrilateral, including the following Series; the Gurwáni Meridional, the Gora Meridional, the Huríláong Meridional, the Chendwár Meridional, the North Párasnáth Meridional, the North Malúncha Meridional, the Calcutta Meridional, the East Calcutta Longitudinal, the Brahmaputra Meridional, the Eastern Frontier—Section 23° to 26° , and the Assam Longitudinal. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
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List of Published Works of the Great Trigonometrical Survey of India—(Continued).

Synopses of the Results of the Great Trigonometrical Survey of India, comprising Descriptions, Co-ordinates, &c., of the Principal and Secondary Stations and other Fixed Points, of the Several Series of Triangles, as follows;—

- Volume I. The Great Indus Series, or Series *D* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. II. The Great Arc—Section 24° to 30° , or Series *A* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. III. The Karáchi Longitudinal Series, or Series *B* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. IV. The Gurhágárh Meridional Series, or Series *F* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. V. The Rahún Meridional Series, or Series *E* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VI. The Jogí-Tíla Meridional Series, or Series *G*, and the Sutlej Series, or Series *H* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VII. The North-West Himalaya Series, or Series *C* of the North-West Quadrilateral, and the Triangulation of the Kashmir Survey. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.
- Do. VIII. The Great Arc—Section 18° to 24° , or Series *A* of the South-East Quadrilateral. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.
- Do. IX. The Jabalpur Meridional Series, or Series *E* of the South-East Quadrilateral. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.
- Do. X. The Bider Longitudinal Series, or Series *D* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XI. The Biláspur Meridional Series, or Series *F* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XII. The Calcutta Longitudinal Series, or Series *B* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIII. The East Coast Series, or Series *C* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.

G. T. SURVEY OF INDIA



SYNOPSIS OF THE RESULTS OF THE OPERATIONS OF
THE GREAT TRIGONOMETRICAL SURVEY OF INDIA
VOLUME XV.

DESCRIPTIONS AND CO-ORDINATES
OF THE
PRINCIPAL AND SECONDARY STATIONS AND OTHER FIXED POINTS OF
THE RANGIR MERIDIONAL SERIES
OR SERIES K
OF THE
NORTH-EAST QUADRILATERAL.

BY LIEUT.-GENERAL J. T. WALKER, C.B., R.E., F.R.S., &c., &c.,
SURVEYOR GENERAL OF INDIA, AND SUPERINTENDENT OF THE TRIGONOMETRICAL SURVEY,
AND HIS ASSISTANTS.



M e h r a D u n :

PRINTED AT THE OFFICE OF THE TRIGONOMETRICAL BRANCH, SURVEY OF INDIA.

B. V. HUGHES.

1883.

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ERRATA ET ADDENDA.



PAGE

8—~~K~~.

line 27 from top

for (1794)*read* (1774)

" " " "

„ Naju

„ Háfiz Rahmat

Throughout the text the following points

Bádsháhpur

Muhammadabad

Chamári

Parbata

Gopálpur

Pola

Kálpi

Sháhabad

Kalra

Shamsabad

Maudó

have been treated and printed as if they had been visited stations, and have the letters s. or h.s. affixed to them. In the table of Azimuths, commencing on page 26—~~K~~, azimuths *at* these points of surrounding stations are given; this should not have been done. On the Charts, however, these points are correctly exhibited as *intersected* points.

January, 1883.

J. B. N. HENNESSEY,

In charge of Computing Office.

REFERENCES.



The abbreviations employed in the text are as follows:—

h.s.	denotes	hill station secondary
s.	„	station secondary
t.s.	„	tower station secondary

These abbreviations are only placed after stations where a theodolite has been set up and observations taken to surrounding points.

The latitudes and longitudes of all points shown on the Charts at the end of this volume will be found in the text. The latter exhibits numerical values of triangles only to points of a superior class, to which alone, if exhibited on the Charts, lines are drawn: these lines are either continuous throughout, or dotted for half the length and continuous for the other half: the dots indicate that the bearing was not observed, and in such cases numerical values of azimuths are not given. For other points, difficult to identify or of comparatively less accuracy, numerical values of triangles or azimuths are not given.

January, 1883.

J. B. N. HENNESSEY,
In charge of Computing Office.

PREFACE.



The Rangir Meridional Series is the second meridional series from the west of the sixteen chains of triangles included in the Section of the Principal Triangulation of the Survey of India which has been named the North-East Quadrilateral. This Section embraces the area within the Meridians of 78° and 92° and the Parallels of 23° and 30° ; and for reasons explained in Section 7 of Chapter I of Volume II of the *Account of the Operations of the Great Trigonometrical Survey*, its general reduction was postponed till that of the neighbouring Quadrilaterals, viz., the North-West and South-East, had been completed, whereby two of the Series, the Great Arc, Section 24° to 30° , and the Calcutta Longitudinal, entering the periphery of the North-East Quadrilateral, became finally fixed. The general principles of the Simultaneous Reduction, and the procedure followed in carrying it out, are the same as have been explained in Volume II of the *Account of the Operations, &c.*, and full details of the whole of the principal triangulation which is at present included in the Quadrilateral, will be found in Volumes VII and VIII of the *Account of the Operations, &c.*

As however the entire contents of the volumes of the principal triangulation are not needed by geographers and surveyors, and moreover as those volumes give no details of the secondary triangulation—which is of considerable value for local requirements—it is obviously desirable that synopses of the final results of the whole of the operations, including the secondary as well as the principal triangulations, should be published for general use, in such a form as to be most suitable for convenience of reference. This has already been done as follows;—

<p>I. Great Indus Series. II. Great Arc, Section 24° to 30°. III. Karáchi Longitudinal Series. IV. Gurhágurh Meridional Series V. Rahún Meridional Series. VI. Jogí-Tila and Sutlej Series. VII. North-West Himalaya Series.</p>	}	Already published.
For those also of the South-East Quadrilateral, viz.,		
VIII. Great Arc, Section 18° to 24° .		
IX. Jabalpur Meridional Series.		
X. Bider Longitudinal Series.		
XI. Biláspur Meridional Series.		
XII. Calcutta Longitudinal Series.		
XIII. East Coast Series.		
And for the following Series of the North-East Quadrilateral,		
XIV. Budhon Meridional Series.		

The present is the 15th Synoptical Volume and the second of those appertaining to the North-East Quadrilateral, and it gives the results of the whole of the triangulation, both the principal, which was executed with theodolites having azimuthal circles of 15 and 18 inches in diameter read by 3 micrometer microscopes, and the secondary, which was executed with smaller theodolites read by verniers.

By the process of reduction which has been followed the principal triangulation has been rendered perfectly consistent, both internally and externally; internally, so that if in any one of the several polygonal figures of which the chains may be composed, calculations are carried from one station to another in every possible direction, the same results will be inevitably deduced; and externally, so that the values of the co-ordinates of any station, when computed from the given co-ordinates of any other station, with the final linear and angular data, will be the same, whether the calculation is carried directly through the series, or circuitously through any of the other chains of triangles comprising the North-East Quadrilateral. All secondary triangulations which emanate from one side of the principal series and close on another side thereof, or on a contiguous series, have also been made consistent throughout.

As regards the general arrangement of this volume, it is necessary to point out that the several sections have been prepared and printed at different times, and that the work has extended over several years. The Introduction and the Names and Descriptions of the Principal Stations were originally prepared for Volume VII of the *Account of the Operations, &c.*, and when a sufficient number of copies had been printed for that work, additional copies were struck off for the present Synopsis. The Alphabetical and Numerical Lists of Principal Stations, pages 1—*K*. and 2—*K*., were printed prior to the year 1868, when the general programme for the final reduction of the whole of the Triangulation of India was drawn up; there was then a long pause in the printing, while the Simultaneous Reductions of the North-West, South-East and North-East Quadrilaterals were being completed; this was done by the year 1877, when the secondary triangulation was adjusted in accordance with the principal, and then the printing of this volume was resumed.

The data given in this volume are the following:—

First (page 1—*K*.), an alphabetical list of the names of the principal stations, showing the numbers assigned to them, which were employed in the reductions as being more convenient to use than names.

Second (page 2—*K*.), a numerical list giving the names corresponding to the numbers.

Third (page 3—*K*.), descriptions of the principal stations—of their structure and positions—as taken from the original records of the observations, and supplemented by an Addendum, page 47*—*K*., giving the most recent information of their condition which has been received up to date.

Fourth (page 10—*K*.), the angles and sides of the principal triangles, numbered and arranged in order from south to north.

Fifth (page 13—*K*.), the angles and sides of certain secondary triangles. The numbering is here made consecutive to that of the principal triangles, in order to facilitate references which are made in other sections to the place where the length of a side is to be found.

Sixth (page 26—*K*.), the azimuths of surrounding stations and points, at principal, principal-auxiliary, and secondary stations, the latter arranged in alphabetical order.

Seventh (page 34—*K*.), the co-ordinates and descriptions of all stations and points arranged in alphabetical order.

The heights of the stations depend in the first instance on the finally determined values of the stations of Tinsmál and Rangir of the Calcutta Longitudinal Series (of the South-East Quadrilateral), and of Sisgarh and Atária of the North-East Longitudinal Series. In addition to these fixed heights, the heights of Stations XIX, XX and XXXI were determined by the Spirit-leveling Operations of this Branch of the Department, and that of Station VII by similar operations of the Revenue Branch. The manner in which the heights of the remaining stations have been made to accord with those above designated, is explained in Section 7 of Chapter II, Part I of Volume VII of the *Account of the Operations, &c.* The datum to which all heights have been referred is the mean sea level of Karáchi (Kurrachee). It may be here stated that all trigonometrically determined heights invariably refer to the upper surfaces of the central masonry pillars which are constructed for the instruments to stand on. Spirit-leveled values sometimes refer to the upper surface and sometimes to the basement of the pillar, whichever the leveling staff was set on; a description of the exact point referred to is given in each instance in footnotes to the pages of the Co-ordinate List, commencing on page 34—*K*.

It has not been considered necessary to publish the whole of the details of the secondary triangulation, portions having been executed originally for preliminary geographical purposes, to facilitate the construction of a first map of India, and the objects observed having in many instances been flags and temporary marks which must long since have disappeared. The sides and angles of 320 triangles, which were selected as most likely to be still in existence and of future use, and the azimuths of all these sides, have been given; but for a number of other points the co-ordinates only have been given. With the aid of Nos. X, XI and XII of the *Auxiliary Tables to facilitate calculations of the Survey Department of India*, Dehra Doon 1868, local surveyors, working on a system of rectangular co-ordinates, can readily transform the spheroidal co-ordinates here given to suit their own requirements.

The Longitudes depend on an astronomically determined value of the longitude of the Madras Observatory, $80^{\circ} 17' 21''$, which was deduced about the year 1815. There has long been reason to believe that this value was about $3'$ too great; but, pending the final determination of the longitude of the Madras Observatory, it has not been considered desirable to alter the value, which has therefore been maintained up to the present time. An electro-telegraphic determination of the longitude of Madras from Greenwich, commencing with the difference between Suez and Greenwich—determined, in 1874, under the superintendence of the Astronomer Royal—was completed in 1877 by the determination of the difference between Suez and Madras, by Captains Campbell and Heaviside, as a part of the operations of this Survey. The combined result places the Observatory at Madras in Long. $5^{\text{h}} 20^{\text{m}} 59^{\text{s}}.42 = 80^{\circ} 14' 51''.30$. Thus the following precept may be accepted with considerable confidence,—

**All the values of longitude in this volume require a constant correction,
probably of $-2' 30''$.**

As regards the orthography of Indian names in the present volume. The Alphabetical and Numerical Lists of Principal Stations, at the commencement of the volume, were printed before the year 1868, in accordance with the rules introduced by Colonel Everest for use in the Survey Department. Subsequently, in 1874, several provincial lists of spellings, constructed under the immediate orders of the Government of India, were received; and thereafter the newly authorised spellings were adopted for all names and other words contained in these lists; but for words for which there was no specific authority, the spellings have been framed in accordance with the methods followed in the preparation of the published lists, reference being made in the present instance more particularly to the Gazetted List for the North-West Provinces. As a general rule the pronunciations of the vowels are as follows:—*a* has a variable sound as in woman, rural, paltry; *á* as in tartan; *i* as in bit; *í* as in ravine; *u* as in bull; *ú* as in rural; *o* as in note; *e* as *a* in say; *au* as *ou* in cloud; *ai* as *i* in ride.

The Charts accompanying this volume show the whole of the principal stations and triangulation, the positions of all the secondary points, and those portions of the secondary triangulations of which full details of the angles, sides and azimuths are given. With the aid of the Charts it is hoped that little difficulty will be met with in finding out any of the data which may be required. The descriptions of the secondary stations are in some cases not as full and clear as is to be desired: this arises from the inadequacy of the information entered on the spot by the surveyors in their field books; every effort has been made to supplement the field books, whenever it was found practicable to do so, in order to facilitate the future identification of the stations; all the information which is forthcoming has now been given.

The general arrangement of this volume and the preparation of the data which it contains have been the work, at different times, of Mr. Hennessey, M.A., F.R.S., Major Herschel, R.E., F.R.S., and Mr. Cole, M.A. Major Herschel moreover supervised the Simultaneous Reduction of the North-East Quadrilateral of which this Series forms a portion, while the Introduction to this volume was written by Mr. C. Wood, Surveyor 2nd Grade. Great pains have been taken to secure the utmost accuracy in preparing the data and passing them through the press.

CALCUTTA, }
January, 1883. }

J. T. WALKER, LIEUT.-GENERAL, R.E.,
Surveyor General, and Superintendent of the
Great Trigonometrical Survey of India.

RANGIR MERIDIONAL SERIES.

RANGIR MERIDIONAL SERIES—(LONG. $79^{\circ} 30'$).

INTRODUCTION.

The Rangir Series is the second in order, reckoning eastwards from the Great Arc, of the meridional chains of triangles which are included in the North-East Quadrilateral. It is aligned, as closely as the nature of the country would allow, on the meridian of Rangir, *viz.*, $79\frac{1}{2}^{\circ}$. It emanates from the side Tinsmál-Rangir of the Calcutta Longitudinal Series, and extends over a meridional distance of about $4\frac{1}{2}^{\circ}$, up to the North-East Longitudinal Series. It was constructed throughout as a chain of single triangles, but with the introduction of a trigon around the station of Muhammadabad (xxii). For the first hundred miles of its length, it crosses the low hills which, generally speaking, may be said to form the northern outliers of the Great Vindhya range; and in this part of its course, it traverses portions of the modern districts of Saugor, Damoh, Jhānsi and Hamīrpur and of the Native States which are affiliated with the Bundelkhand Agency. It then enters the great plains of the Gangetic valley, and after crossing portions of the modern districts of Jālaun, Etāwah, Farrukhabad, Shāhjahanpur, Budaun and Bareilly, terminates in the forests of the Tarāi at the foot of the Himalayan mountains.

The execution of the Series was originally entrusted to Lieutenant A. S. Waugh of the Bengal Engineers—afterwards Surveyor General—Lieutenant T. Renny of the same Corps being chosen at the same time to conduct the adjoining chain of triangles to the east, *viz.*, the Amua Series. Both these officers had recently been appointed to the Great Trigonometrical Survey, on the recommendation of Major Everest, the Surveyor General, with a view to the early commencement of these chains of triangles. But as they had had no previous experience of principal trigonometrical operations which were designed to subserve the requirements of Geodesy as well as Geography, Major Everest recommended that they should be primarily employed as assistants in the operations which were then being carried out on the Great Arc, in order to gain a practical knowledge of duties such as those which they were eventually intended to undertake, observing that “although both these gentlemen are highly talented as far as theory goes, they cannot be expected to conduct duties of this sort intuitively”.

At the time when their appointments to the Great Trigonometrical Survey were sanctioned by the Government they were both in Calcutta; and as in marching from Calcutta to the scene of their operations, in Central India, they would have to pass through or near

certain localities of which "as little was known as of the heart of Africa", Major Everest proposed that they should carry a rapid route-survey (supplemented by suitable descriptive notes) through the tracts in question. He drew up instructions for their guidance, which are given below *in extenso**, as they are interesting for the evidence they afford of the necessity which existed in those days for combining surveys of the roughest description, which were wanted to satisfy immediate geographical requirements, with operations of extreme precision, which were intended to form a permanent basis for all future survey operations.

Even the primary operation of selecting suitable sites for the stations of the principal triangulation was made to subserve the geographical requirements of the moment; it furnished approximate values of the positions of the stations themselves and of the hill

**Extract of Instructions communicated to Lieutenants Waugh and Renney, by the Surveyor General in November 1832.*

The first obvious blank in all our maps is the mass of mountain land on which Rotasgurb is situated.

The range called "Kula Phar" to the east of this which bounds the valley of the Soane may be generally laid down.

But as to the route over the mountain at the back of Rotasgurb, this gap in our knowledge may well be filled up more particularly. I took a route of the tract between Rotasgurb and Punnoogunge near Bijeygurb in 1817, which is perhaps as accurate as route surveys in general. It was plotted very carefully by me from my field book and I lent it to Colonel Blacker for the purpose of facilitating the operations of my own people under Mr. Olliver in 1825. In that plan there is a road from Weenee branching off to Chunar left incomplete, the last place on it being Bogheelah. There is also a road from Dhobaee branching off to Chaonpoor from the road between Bijeygurb and Sheergurb, the most advanced place on it being Peeprah. If these two roads could be explored they would connect the details of my sketch with the general map, and the details would be filled up more satisfactorily still if direct roads can be found leading from Sheergurb to Rotasgurb, from Bijeygurb to Chunar, and from Bijeygurb to Rotasgurb along the face of the mountains.

I leave it to your judgment to examine or not any portion of my route again. You may perhaps lay down the hills more accurately, which is an object, and as it was a very hasty performance, you may if you find any errors correct them, but I think you will find it as good as route surveys usually are.

Rough plans of Bijeygurb and Sheergurb will be of use as well as plans of any other hill forts on that range. Historical facts connected with Sheergurb may be instructive. The tract to the southward of Sonegurra or Songurb leading to Omurkuntuk is absolutely *terra incognita* and it is one of the most interesting parts of India both geologically and geographically. The route I wish to be explored is that leading to Omurkuntuk from Rajgurb on the Soane, but you may be compelled to adopt some other route and I must rely on your prudence to take that which will afford the most information. Rajgurb appears to lie in Latitude $24^{\circ} 35'$ and Longitude $82^{\circ} 6'$, Omurkuntuk in Latitude $22^{\circ} 40'$ and Longitude $81^{\circ} 43'$. Whatever route you take however, you must cross the southern face of the Kimoor range respecting which any particulars you can give will be interesting.

Your Latitudes and Longitudes will all be referred to the nearest principal stations of the Longitudinal Series of the Great Trigonometrical Survey, whenever you can manage to discover them.

Having explored the route to Omurkuntuk, you will proceed if possible along the northern bank of the Nerbuddah to Jubbulpore and from thence to Seronj, where you will fall in with the party under Mr. Rossenrode, and I wish you to take advantage of that opportunity to acquire a practical acquaintance with the method of conducting Trigonometrical operations in the field.

I need not point out to gentlemen of your good sense and talent how necessary it is to devote your whole energy to this object, and how manifest an advantage it is to you to enter on your career as geodesists with full liberty to use the splendid instruments of my department and try your hand at any part of the operations without apprehension of doing mischief. A course of regular operations could not hold out those advantages because business requiring the most scrupulous attention to accuracy is then to be performed; but in an approximate series, if you should make a wrong reading, it is but putting the pen through it, and the work will still be accurate enough for the object in view. I shall therefore trust to your own sense of propriety to lose no opportunity of qualifying yourselves to take charge of a party on one of the independent meridians; but when you can do so without injury to this principal object, I wish you to furnish as many data for the topography of the country within the Series as you can collect.

Data.

Barometer to be observed every day three times if possible at the same hour.

Two Barometers to be observed simultaneously when the depths of the beds of rivers or the heights of mountains are required.

Angles of elevations of any high peaks to be observed from two places whose distance is known, as well as the horizontal angles, so that the distances and heights of the main features of the country may be fixed.

Courses of rivers.—Where they emerge from the mountains to the plains. Their height at flood. Their minimum if perennial. Their period of drought if dried up. Locality of their sources. The strata they pass through, and the breadth of their beds. The depth of the channel as respects the surrounding country. Whether the banks are steep or cut into ravines or sloping.

Nature of the country passed through.—If a valley, how bounded, by high hills or low? The nature of those hills. Are they of primary or secondary formation? Do they contain mines of coal or marble or asphaltum or rock-salt, &c., or is there gold, lead, copper, &c.

peaks, towns, villages or other prominent objects seen from them, by observations taken with small theodolites or sextants during the course of the general reconnaissance of the country. The preliminary triangulation thus executed came to be called the Approximate Series, for it was intended to serve as a *pis aller* until the principal observations with the great theodolites could be completed. It was invariably pushed on as rapidly as possible without regard to nicety, observations being taken sometimes from trees and lofty scaffolds in the plains, and sometimes to distant torches and blue-lights which could be seen with the aid of nocturnal refraction over intervening obstacles, before the 'rays' between the principal stations had been cleared for the final observations.

Lieutenants Waugh and Renny started from Calcutta early in the field season of 1832-33, with two assistants. After carrying out, as fully as was possible, the instructions they had received for making route-surveys and drawing up reports of the *terra incognita* through which they had to pass, they reached the camp of the party which was then employed on the Great Arc, at the principal station of Mao, in the Gwalior territory, about 18 miles from the town of Sipri. They devoted the remainder of the field season to acquiring an insight into the nature of the operations of the principal triangulation and some practical familiarity with the details.

The following recess was spent in Agra, where both officers were for some time occupied in bringing up their maps, plans, and reports on the route-surveys which they had recently accomplished, and afterwards in making preparations for commencing—in the next field season—the chains of triangles which had been respectively allotted to them.

Lieutenant Renny's subsequent operations being described in the Introductory Account of the Amua Series, we have here to deal only with those of Lieutenant Waugh, on the Rangir Series.

The party which was intended to break ground on this Series was constituted as shewn

Season 1833-34.

PERSONNEL.

Lieut. A. S. Waugh, Bengal Engineers, 2nd Assistant.
Mr. J. W. Armstrong, 3rd Class Sub-Assistant.
" W. R. Forster, " "

in the margin. It was furnished with an 18-inch theodolite by Cary for the principal observations*, with two 7-inch instruments for the secondary work, and with such other equipment as was deemed necessary. It started from Agra on the 30th of November 1833, and marching

to be found in them? How far from water carriage? Mineral springs, hot or cold. The order of the strata shewn in the beds of rivers and the bare sides of mountains.

Manners and language of the people.—Are they Hindoos or Mahomedans, or what is their religion? Are they obliging or hostile to strangers? To what state of civilization have they attained? Their progress in agriculture, manufactures, &c. The weapons they use. The language they speak. Are they a truth-telling people or deceitful and prone to falsehood? If the inhabitants are wild, are the settlements formed by the natives of Hindoostan amongst them numerous?

Fertility of the country.—Are there means of irrigation? Does the country admit of such being constructed, as building dykes? Number of crops a year? Are the people generally comfortable or oppressed? Are they wandering tribes, or attached to their homes?

Is the country open or covered with forest? What kinds of trees are found in the forests? Enumerate the different kinds of building wood to be met with. Are ebony and other kinds of wood fit for cabinet work found there? Of building materials, what means of water carriage? Drawings of curious temples, and all objects tending to illustrate the manners, customs, history, geology, and natural and artificial features of the country will be acceptable.

* Known as Cary's 18-inch L; for a description of this instrument see page 69 of the Appendices to Volume II.

vid Gwalior, Datia, Jhānsi and Saugor, arrived at Rangir about the 6th of January 1834.

Here Lieutenant Waugh commenced operations by taking a set of circumpolar star observations for determining a fundamental value of the azimuth, which was to be employed instead of the value that had been brought up through the Longitudinal Series from Kaliānpur. He then proceeded to lay out the triangulation, employing the side Rangir-Tikaria as his base, in conformity with the instructions he had received from Major Everest. But the ground immediately to the north of that side proved utterly impracticable for the extension of the triangulation therefrom; for the side was of considerable length—over 30 miles—and was confronted by a portion of the Vindhyaçal range which here develops itself into a mountainous table-land of considerable breadth, covered with high forest trees and dense underwood, and devoid of any commanding eminences. Thus the selection of symmetrically situated stations was a very difficult task to accomplish.

Lieutenant Waugh reported that after “having traversed the whole range and observed from nearly every high tree and rising ground”, his endeavours had all been in vain to advance the Series in any other way than by constructing a tower station 35 feet high at Saipur on the hills to the north of Rangir to command the view. The tower was commenced, and it was being built of stones set in clay instead of mortar, and had attained a height of 10 feet, when the water supply failed; the remaining 25 feet was run up with dry stones, and it came tumbling down almost immediately after completion. This disaster, combined with the circumstance that it would be necessary not merely to rebuild the tower at Saipur, but to construct a tower 60 feet high on the Sonha hills, at a considerable cost, if the originally intended side of origin was to be maintained, eventually induced Lieutenant Waugh to adopt the side Tinsmál-Rangir as the origin of the Series. At first however he loyally endeavoured to carry out the instructions he had received, reporting progress constantly and soliciting further orders; but the postal arrangements in those regions were so defective that he frequently did not receive answers to his letters to the Surveyor General in less than two months. A change of base involved the rejection of the work of several months which a young officer might well shrink from doing on his own responsibility; but immediate action was necessary, and Major Everest when all the facts were reported to him, at once approved of the change, saying that it was quite sufficient “if one flank of the Series—it did not matter which—was kept close to the meridian of the operations”, and giving as an illustration the Great Arc Series which “runs as often on one side of the meridian as the other” and follows the principle of “not fighting with a difficult tract when its flank can be turned”. As regards the two towers which were required for the triangulation from the original base, Major Everest wrote that he preferred “vitiating the symmetry of the triangles to having towers of 60 feet in a hilly country to start with; the notion is startling and must be abandoned”.

Thus after five months of harassing anxiety and failure, during the best time of the year for field operations, Lieutenant Waugh found himself compelled to commence work on a new base at the time when the field season was nearly ending. But he had resolved that, in spite of all the difficulties which had beset the work at the very outset, the Rangir Series should not be found “to have fallen in arrears or have lagged behind its neighbours”.

He remained in the field until the end of July, so as to avail himself of the clearing of the atmosphere which usually takes place when the rainy season commences; and he succeeded in observing the angles of the principal triangles up to the side Nágonáth-Phára, (VIII-IX) thereby completing the Series for a distance of 100 miles, and achieving an admirable out-turn of work in an unusually short space of time. Even the operations in the first five months of the field season, though a failure as regards the advancement of the principal triangulation, were fruitful in results of much value for immediate geographical requirements; as a large area of country had been reconnoitered, and the positions of several towns and forts of importance, lying mostly in Native States as yet unsurveyed, had been fixed from various secondary stations at which observations were taken with the small theodolites in the course of the search after suitable sites for the principal stations.

The latter 40 miles of the season's work on the Rangír Series lay in the Hamírpur District, which was suffering so terribly at the time from famine that Mr. Pidcock, the Settlement Officer of the district, reported that the season was one of unparalleled distress to the people and loss to Government,—the miseries of famine, pestilence, and exile having denuded the district of nearly one-half of its population.

In submitting from recess quarters the computations of the field season's operations, Lieutenant Waugh noticed with much regret the presence of *triangular errors* of over six seconds in the 5th and 6th principal triangles. He stated that he would have re-observed the angles had it not been for the impossibility of procuring further supplies of food for his people; being diffident of his skill as an observer he said that though not conscious of any remissness in this particular portion of the work, he could not but suppose that the errors "arose chiefly from bad observations". It is now however quite certain that the errors were due not to the observer but to the instrument employed, which was soon found to be of inferior value and was discarded.

Lieutenant Waugh's out-turn of work during the year consisted of a set of circumpolar star observations for azimuth; 8 principal triangles; 21 secondary triangles of the first class, and 43 of the third class; the elevations of all the principal and of 26 secondary stations, also a skeleton plan of the triangulation and a reconnaissance of the tract of country operated in. The latter included a part of Bundelkhand of which Lieutenant Waugh remarked that "it was peculiarly favourable for secondary work; the detached granite ridges command extensive views; forts and temples perched on eminences abound; indeed a complete map might be made by triangles of the 1st, 2nd, and 3rd classes, and had it not been for the difficulties which beset my *debut*, I should have formed such a map without at all delaying the Principal Series".

The chain of triangles had now been carried into the plains of the Gangetic valley, only one more hill remaining to offer its friendly assistance in presenting a suitable site for a station of observation. One-third of the chain was complete, all of which—with the exception of the first triangle, measured in the course of the operations of the Calcutta Longitudinal Series—had been achieved by Lieutenant Waugh in a single year, under many and great difficulties as already set forth. Nevertheless the completion of the remaining two-thirds occupied nearly eight years to accomplish. The great retardation in the subsequent rate of

progress was due to two causes. *First*, at every station in advance—with the single exception of the hill of Gokulphāra—towers had to be constructed to furnish stations of observation, and on sites carefully selected so as to present the fewest possible obstacles on the lines between the stations; moreover all obstacles to mutual vision had to be removed before the final observations could be commenced. *Secondly*, in order to construct a chain of triangles composed of as few links as possible, the sides of the triangles in the plains were maintained throughout at so great a length that the rays between the stations grazed the surface of the ground for a distance of several miles, thus making distinct mutual visibility impossible, excepting under unusually favourable atmospheric conditions which were of very rare occurrence.

The building of towers required the co-operation of the Department of Public Works; the Surveyor General had therefore moved the Government to issue the necessary instructions to that Department. Although anticipating that some delay would occur before the arrangements for the construction of the towers could be matured and suitable designs prepared, he was nevertheless confident that the building of artificial elevations of some sort or other would eventually be sanctioned. He accordingly issued instructions that field operations should be resumed during the ensuing field season, but that they were to be restricted to the selection of suitable sites for future tower stations. At the same time he prescribed a method of 'ray-tracing', for site-selection, by carrying a traverse with a theodolite and perambulator over each ray, with a view to effecting a close examination of the ground in each instance, before the final adoption of the sites and the commencement of ray clearing. *Vide* Section 3 of Chapter II of Vol. II.

In the following field season the party started from Cawnpore on the 10th of October.

Season 1834-35.

PERSONNEL.

Lieut. A. S. Waugh, Bengal Engineers, 1st Asst.
Mr. J. W. Armstrong, 2nd Class Sub-Assistant.
" W. R. Forster, 3rd " "

Lieutenant Waugh wrote a circular letter to the Civil Officers of the various districts through which his operations would have to pass, pointing out his dependence upon them for obtaining labour and supplies, and explaining the necessity for the removal of all obstructions on

the lines between the principal stations; he said that great care would be exercised both by himself and his assistants not to inflict more injury in the removal of obstacles than was absolutely necessary, and due recompense would be readily made for all property destroyed; also that as he had no leisure nor inclination for entering into disputes with the owners regarding the cutting down of trees or removing of other obstacles, he trusted the Civil Officers would issue plain and positive orders for his support. This timely explanation of matters led to very happy results in the substantial assistance which was rendered to the surveyors throughout the field season.

Writing from Kanwa (xii), where the ray-tracing was begun on the line to Gura (xi), Lieutenant Waugh reported that the country thereabouts abounded with mud forts situated on the high lands. "Some of these", he said, "are uninhabited, with defences ruined, and presenting a rude mass with steep sloping sides; they are solid, and a station placed in the middle would be permanent even were the sides to crumble away to a slope of 45° which is an event improbable, considering the tenacity of the material and its dis-

“position in successive strata or layers, according to the usual habit of the natives in building earthwork”. Other forts were partially tenanted, and had solid towers which could be used as stations. Again, eminences were met with which were crowned with old and untenanted brick buildings, and occasionally with domed temples. It was expected that many of these structures might serve as basements for the stations of the principal triangulation, and thus obviate the construction of towers of the great height which would otherwise be necessary in order to secure mutual visibility over the plains.

Having reconnoitred the country and given a good start to the operations, Lieutenant Waugh was summoned by Major Everest, towards the end of November, to assist in the measurement of the Dehra Dún Base-line, leaving the work on the Rangír Series under the supervision of Mr. Armstrong, the senior of his two assistants. On the completion of the base-line he returned to the charge of the Series, joining Mr. Armstrong in camp on the 20th May.

The party kept the field till the end of June. By this time all the rays had been cleared up to the side Chandanpur-Pothári (xxi-xxiii), and stations had been selected up to the side Janjiri-Gajnera (xxix-xxx), thus furnishing as the out-turn of the season's work a symmetrical series of 20 triangles, of the first 13 of which the rays were all cleared. In reporting on the field season's operations, Lieutenant Waugh stated that “the chief portion of this work having been done during my absence by Mr. J. W. Armstrong, any merit it may possess, either quantitatively or qualitatively, is entirely owing to his zeal and abilities. I have on former occasions borne testimony to the talents and good conduct of Mr. Armstrong as well as Mr. Forster, and I may now add that their efficiency keeps pace with their experience. Their labours during the last season, in the novel and arduous undertaking of carrying a series across the plains without any resource but what their judgment might suggest, so greatly surpass my expectations that it becomes a pleasing duty to me to bring them to the particular notice of the Superintendent”.

During the following recess season, Lieutenant Waugh supplied carefully prepared drawings and estimates of the masonry columns that would be required at the first ten of the tower stations in the plains. These were designed simply for the support of the large theodolites which would be employed in the measurement of the principal angles; they were further intended to mark the station permanently. The surrounding platform for the support of the observer, his attendants, and the observatory tent, was to be constructed as a portable scaffolding, which would be removable at pleasure, in order to be employed alike at all the stations; bamboo ladders were to be erected for the use of the signallers whenever the scaffolding was not available. The early construction of the masonry pillars was very desirable; therefore, in forwarding the designs for them to the Government, the Surveyor General pressed for an early decision, as otherwise the progress of the Series would be arrested. Thereupon the Military Board—to which the general construction of all public works was then entrusted—was directed to adopt the necessary measures for the construction of the required columns of masonry, in communication with Lieutenant Waugh.

The party had already (3rd October) taken the field when the orders of Government

were received. As the erection of the masonry columns would take some time, no final observations were contemplated this season. The party was therefore to be occupied in clearing rays, selecting stations and also in measuring the angles approximately—with small theodolites—for immediate geographical requirements.

Season 1835-36.

PERSONNEL.

Lieut. A. S. Waugh, Bengal Engineers, 1st Asst.
Mr. J. W. Armstrong, 1st Class Sub-Assistant.
„ W. R. Forster, 2nd „ „

Early in this season the services of Lieutenant Waugh were again drawn off to assist Major Everest, whose health was in such an unsatisfactory condition that his medical advisers strongly recommended him to abjure all further active field work and proceed to sea. The Surveyor General was most anxious to finish the operations on the northern section of the Great Arc; and at the same time he wished to guard against any sudden emergency, by having with him an officer in whose hands he could confidently leave the conduct of those operations, the early completion of which was of great importance in the interests of geodesy. Accordingly, with the sanction of Government, he directed Lieutenant Waugh (on 8th December) to repair with as little delay as possible to the Head Quarters of the Great Arc party which was then at Kaliána—the northern astronomical extremity of the Arc. Thus the management of the Rangir Series was again left in the hands of Mr. Armstrong, an officer to whom it could be confidently entrusted.

The ray-clearing and approximate measurement of the angles was carried on without cessation, and under many difficulties, until the 22nd of June, when the rainy season set in with such violence as to prevent further operations in the field. Fourteen rays had been cleared and approximate angles measured between stations previously selected, thus bringing this part of the operations up to the side Janjiri-Gajnera (xxix-xxx). Five stations were selected further north, by which the Series was extended to the outer Himalayas.

Meanwhile the Executive Engineer of the Cawnpore Division was proceeding with the construction of the ten masonry columns which were required to be erected at the principal stations, in accordance with the designs previously furnished by Lieutenant Waugh. At the station of Atsu (xvi), in the Etawah District, the overseer was completely thwarted by the determined opposition of a zemindar, Zálím Sing, the owner of a fort where a column was to be erected, the site for which he had originally given over voluntarily for the purpose; but when the overseer appeared on the scene, just one year afterwards, Zálím Sing put forward the most frivolous pretexts for holding back from his concession, and even went the length of building around the very spot which had been chosen. The overseer was compelled to suspend his operations, and a lengthened correspondence with the Civil Authorities ensued. Lieutenant Waugh pointed out that any change made in the site of the station would involve a loss to Government of Rs. 1,700, which should be defrayed by the zemindar as it would be due solely to a breach of faith on his part. This argument produced more practical results than all former persuasion had done; and it was finally settled that Mr. Armstrong should proceed to the spot, early in the following field season, and set the overseer to work, after personally arranging matters with Zálím Sing.

During the recess—which was spent at Bareilly—Mr. Armstrong prepared designs and estimates for fourteen columns remaining to be erected, and of modifications to the column

at Bisungarh (xx), which had been found to require an increase of 9 feet to its height, in order to be seen from the two forward stations.

Mr. Armstrong marched, on the 26th September, from Bareilly to make the necessary

Season 1836-37.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.
 „ J. Mulheran, 2nd Class „

arrangements regarding the construction of the column at Atsu (xvi). It was found that the zemindar still objected to give up the site which he had originally conceded; he was probably more influenced by the idea of preserving his dignity than any other reason; for he willingly gave another site, within a few feet of the first, but still at a sufficient distance to necessitate a partial reclearing of all the rays between Atsu and the surrounding principal stations, a work which occupied several days.

Mr. Armstrong then proceeded southwards to examine the columns which had been built by the Department of Public Works, and clear the rays of whatever vegetation had sprung up on them during the period of two years which had elapsed since they were first opened. He found the condition of some of the columns far from satisfactory. At Husapura (xiv) so much deflection had taken place, owing to insufficient foundation and bad workmanship, that the column was in a dangerous condition and had to be rebuilt; arrangements for this were immediately made, as the column would be soon wanted in the course of the measurement of the principal angles. The columns at other stations had also become deflected to an extent which rendered it impossible to suspend a plumb-line from the centre of the summit, through the hollow core, over the centered markstone on the ground-level at the base; but this defect was got over, partly by moving the markstone, and partly by adding a capital of larger diameter to the pillar, to increase its upper surface and thus permit of the theodolite being set up excentrically. Elsewhere the columns were found to be “correct and adapted for final work”.

Mr. Armstrong then proceeded to Cawnpore to take over the portable scaffolding which was to be employed around the columns at each station; these had meanwhile been constructed by the Ordnance Department, from designs supplied by the Surveyor General. No description of the so-called portable scaffolding is now forthcoming; but some idea of its bulk may be formed from the circumstance that no less than 10 four-bullock carts were required for its transport.

By the end of November everything was ready at the first ten tower stations for the measurement of the principal angles, and arrangements had been made for constructing columns at fourteen stations in advance by the Bareilly Division of the Department of Public Works. Mr. Armstrong therefore proceeded to Gokulphára (x) to resume the final observations, taking with him an 18-inch theodolite—Cary’s L, described at page 69 of the Appendices to Vol. II—to employ in the measurement of the principal angles. By the 10th April, the whole of the horizontal angles had been measured at stations viii to xvii inclusive. The measurement of the vertical angles had however terminated at stations ix and x, because satisfactory verticals could not be obtained; consequently this part of the work was postponed until arrangements could be made for taking simultaneous reciprocal observations, with the assistance of a second observer and instrument.

Observations were being taken at Birona (xviii), and two-thirds had been completed,

when, on the night of the 10th April, the portable scaffolding was set on fire; being very inflammable it was completely destroyed in the course of a few minutes. When access to the summit of the station was obtained next morning by ladders, the instrument appeared at first "to have escaped the effects of the flames"; but eventually it was found to be so damaged as to have become practically useless. The origin of the fire remained a mystery, but is believed to have been purely accidental. This catastrophe, happening in the month of April, necessarily put a stop to all further measurements of the principal angles during this field season.

During the following recess Mr. Armstrong was furnished with another 18-inch theodolite—Cary's M. O., described at page 68 of the Appendices to Vol. II; he was also directed to proceed to Agra, to superintend the construction of another portable scaffolding, with such assistance as he might obtain from the Ordnance Magazine at that place.

Provided with a new scaffolding, Mr. Armstrong commenced the operations of the

Season 1837-38.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.
 „ J. Mulheran, 2nd „ „

field season of 1837-38 by final observations at Bisungarh (xx). Though detained there for sixteen days—from 24th October to 9th November—he was unable to complete the horizontal angles, but succeeded in measuring the vertical

angles simultaneously with Mr. Mulheran, who took the reciprocal angles at the surrounding stations. He then proceeded to Kalsán (xix), where, though he again succeeded in executing his share of the reciprocal verticals, he was still unfortunate as regards the horizontal angles; the condition of the atmosphere was such as to prevent him from obtaining a sufficiently satisfactory view of the signals at the surrounding stations to enable him to measure the angles between them with the requisite degree of precision. Attributing the state of the atmosphere to unprecedentedly high winds, with concomitant clouds of dust, which then prevailed in the immediate vicinity of the River Ganges, he thought it advisable to lose no more time in that neighbourhood, and, passing over three stations—xxi, xxiii and xxiv—he set up his theodolite at Guri (xxv). Here he was detained a whole month, the out-turn of which was only two principal horizontal angles and simultaneous verticals on two rays, besides a set of experimental observations to circumpolar stars for azimuth. The next three weeks sufficed but to take the principal horizontal angles at Dháka (xxvi) and the verticals on the ray to Saipur (xxvii). It was now the 5th of February, and during the next month all that he was able to finish was the measurement of the angles, horizontal and vertical, at the stations of Saipur and Kasrak (xxviii). In writing from the latter station on the 5th of March, Mr. Armstrong reported that owing to the reverses which he had experienced from the state of the atmosphere, he had "only completed two entire triangles on the south side of the Ganges and three triangles on the north side," besides of course the vertical observations which he had advanced *pari passu* with the horizontal measurements. It was his intention at the time to continue his progress as far north as he could proceed in the month of March, and then to return and finish the work below. He made comparatively good progress during the remainder of the month, completing the horizontal and vertical angles up to and including the side Gajnera-Fatehganj (xxx-xxxi), as well as a good number of secondary angles. He then retraced his steps to Guri (xxv), where between the 15th and 19th April he ob-

served the principal angle between the side Pothári-Mau (xxiii-xxiv), the verticals on two rays, and some secondary angles. He next moved on to Mau where he remained until the 8th of May by which time he was able to finish the three principal angles, the verticals along the ray to Dháka, and the secondary angles to surrounding stations and points. But unfavourable weather again set in, and Mr. Armstrong moved into the station of Fatehgarh where he was to spend the recess; there he employed himself on the computations, at the same time holding himself in readiness to start for his next station Pothári (xxiii) whenever the weather might permit; but dust storms continued to prevail persistently and with unusual frequency and violence; thus he was unfortunately unable to take the field again this season in order to bridge over the gap in the triangulation in the immediate vicinity of the Ganges.

The pillars built by the Department Public Works this year in the Farrukhabad and the Bareilly districts, as far north as Fatehganj, were very favorably reported on by Mr. Armstrong who found them in general well built, steady and symmetrical.

The resumption of field operations in the season of 1838-39, was delayed, because the

Season 1838-39.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.
 „ J. Mulheran, „ „

severity of the preceding rainy season had done considerable damage to the portable scaffolding. It had been left standing at the station of Pothári (xxiii), until the month of August when Mr. Armstrong brought it in to Fatehgarh,

for protection against further injury and for subsequent repairs; he experienced considerable difficulty in so doing because of the state of the roads and the large number of carts required for its transport. The damage done to the scaffolding took some time to repair, which, with delays in obtaining carts, prevented Mr. Armstrong from taking the field earlier than 25th December 1838. By the 19th of the following month, he had only succeeded in measuring three principal horizontal angles at the station of Pothári and in taking verticals on the rays to Chandanpur (xxi) and Mau (xxiv). He then moved on to Chandanpur, and completed three angles at this station and the verticals on the ray to Mau, by the 3rd of February. Here he received information of the fall of the pillar at Bagwára (vii of N.E.L.S.); he therefore moved the Executive Engineer of the Bareilly Division to have the pillar rebuilt with all possible despatch, as it would be required for use by the end of March. The station next visited was Bisungarh (xx); the horizontal angles were completed by the 11th of the same month, but no verticals could be obtained. For some unexplained reason Mr. Armstrong was unable to go down southwards, and complete the angles which remained unmeasured at the stations of Biróna (xviii) and Kalsán (xix). This deficiency was not made good for another season.

From Bisungarh Mr. Armstrong marched northwards to the station of Gajnera (xxx), where he arrived on the 12th of March; by the 18th he completed the horizontal angle between Fatehganj (xxxi) and Atária (xi of N.E.L.S.), and had taken verticals on the ray to the latter station. By the 23rd of March, the horizontal and vertical angles at Fatehganj were concluded, and the party was on its way to Atária. The pillars at this station and at Sísgarh (x of N.E.L.S) were found to be very much out of the perpendicular; the former moreover was in a somewhat dangerous condition, several cracks having taken place both

in the shaft and the basement. Though somewhat apprehensive that the pillar at Atária might fall down, Mr. Armstrong set up his large theodolite on it, rather than postpone the observations until it could be rebuilt; it was so much deflected however that the instrument could not be plumbed over the mark-stone in the basement; four small pillars were therefore built round the station, with a mark on each, and these marks formed a quadrilateral figure the diagonals of which intersected in the normal of the point of observation. By the 16th of April, the horizontal and vertical angles at this station and at Sísgarh were disposed of; and by the 3rd of May the ray from Beheri (ix of N.E.L.S.) to Bagwára (vii of N.E.L.S.)—left uncleared in 1836—had been cleared, and the horizontal angles at Beheri had been measured. The work at Bagwára was concluded by the 19th idem, some delay having been occasioned by the necessity for further clearing on the ray to Sísgarh*. The party then proceeded to recess quarters at Bareilly.

At the commencement of the field season of 1839-40 Mr. Armstrong was required

Season 1839-40.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.
 „ J. Mulheran, „ „

to proceed to the camp of the Great Arc party in the Meerut District, to receive instructions and exchange his large theodolite for Harris and Barrow's 15-inch theodolite—described at page 72 of the Appendices to Vol.

II—which had recently been employed with very satisfactory results on the Budhon Series.

Returning to resume field operations, on the 11th November he reached Fatehgarh, where he found his assistant, Mr. Mulheran, on whom he was dependent for the reciprocal observations, completely prostrated with a malarious fever. For this and other reasons the party was detained at Fatehgarh until the 6th of January.

The progress made during the next two months was very small, comprising only the measurement of the two northern horizontal angles at Kalsán (xix), and verticals on the rays Pothári-Guri (xxiii-xxv) and Seontára-Birona (xvii-xviii). By the 21st of April, Mr. Armstrong completed the horizontal angle that had remained unobserved at Birona as well as the simultaneous verticals on the fifteen rays that had hitherto existed as a gap between the side Phára-Gokulphára (ix-x), and Seontára-Birona (xvii-xviii). The party then returned to Fatehgarh. Here Mr. Armstrong found instructions awaiting him from the Surveyor General, directing him to proceed to the Head Quarters at Dehra Dún with the whole of the establishment and instruments under his charge, leaving the portable scaffolding and other heavy ordnance stores in deposit at the Gun Carriage Agency in Fatehgarh.

On the 1st of the following October, Mr. Armstrong started from the Head Quarters

Season 1840-41.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.
 „ J. Mulheran, „ „
 „ W. C. Rossenrode, 3rd Class „

to commence the field operations of 1840-41, and proceeding *via* Fatehgarh marched to Muhammadabad (xxii), where a new station was to be established for azimuth observations, which had also to be connected with the surrounding stations. A tower 16 feet high was erected on the bastion

* Mr. Armstrong reported that when he was observing at Sísgarh in April, the refraction was so great as to enable him to see the heliotrope at Bagwára over every obstruction. Unfortunately this was not the case during the reciprocal observations.

of the fort at Muhammadabad, the construction of which was completed in time for the star observations to be commenced on the 25th December. The azimuth was determined by observations to δ Ursæ Minoris at both elongations. These observations, as well as the measurement of all the horizontal angles of the three triangles connecting xxii with the surrounding stations xx, xxi and xxiii, were completed by the 12th February.

Mr. Armstrong was then transferred to Lieutenant Waugh's party, which was operating near Hyderabad in the Nizam's dominions. Mr. C. Lane, 1st Class Sub-Assistant, was placed in charge of the Rangir party, which he assumed on the 1st of March. Mr. Mulheran extended the Approximate Series in advance into the outer Himalayan Mountains by four triangles, of which the northernmost station (Khánkra) was fixed beyond the 30th parallel of latitude. But these triangles were subsequently incorporated into the North-East Longitudinal Series, at the side of junction with which—Sísgarh—Atária—the Rangir Series is now considered to terminate. Anything that may have to be stated of the triangulation beyond, which was originally executed as a part of this series, will therefore appear in the Introduction to the North-East Longitudinal Series.

The remaining operations in connection with the principal triangulation of the Rangir Series, as at present constituted, were as follows. *First*, in the field season of 1841-42 the vertical angles at and between stations xx and xxi to xxiii, which had not been previously observed were measured reciprocally by Mr. Lane and Mr. Rossenrode, observing simultaneously. *Finally*, in the season 1863-64, when Mr. George Shelverton reached Rangir, during the course of the revision of the Calcutta Longitudinal Series*—the station was found to have been so much injured that there was every reason to believe that the markstone, which was forthcoming in the *débris*, must have been displaced. Happily the marks at the stations of Tinsmál and Kusmár—which, with Rangir, form the first triangle of the chain—were uninjured. Mr. Shelverton therefore constructed a new station at Rangir—in the centre of the *débris* of the first station—and measured the three angles of the triangle Rangir-Tinsmál-Kusmár, and thus connected the Rangir Series with the revised Calcutta Longitudinal Series.

The contrast between the rapid completion of the lower third part of this Series, which is situated in a hill country, with the slow execution of the upper two-thirds which is situated in the plains, has already been noticed at pages vii and viii of this Introduction. The principal cause of the slow progress in the plains was that the sides of the triangles were made of a length which averaged from 18 to 19 miles, and occasionally exceeded 22 miles. Such sides are much too long for satisfactory observations between towers of even the considerable height of those which were erected for the principal triangulation. Thus the measurement of the horizontal angles proceeded very slowly; that of the vertical angles had frequently to be performed so long after the time of minimum refraction that simultaneous reciprocal

* See Vol. II, pages 19 and 71; also Vol. VI, page vii—B.

verticals were often essential to secure even moderate accuracy; and this not only necessitated the employment of a second observer with a complete instrumental equipment, but greatly retarded the progress of the operations. The experience gained on the Rangir Series led to an immediate and very sensible reduction in the lengths of the sides of the triangles in the plains. And further experience showed the desirability of still further reductions in length, in order to obtain the great advantage of mutual visibility at the time of minimum refraction, between tower stations of moderate height; thus eventually an average of 11 miles—ranging from 9 to 13—has come to be recognized as the most suitable length for the sides of the principal triangles in the plains; see Chapter II of Vol. II.

The triangulation of the Rangir Series has been included in the Simultaneous Reduction of the North-East Quadrilateral. The errors actually dispersed on this Series between the origin, Tinsmál-Rangir, and the terminus, Sísgarh-Atária, are:—

In side	{ Logarithm + 0·000,0144,9			
	giving a ratio of about $2\frac{1}{8}$ inches per mile.			
„	Latitude	...	...	+ 0"·433
„	Longitude	...	...	+ 0·796
„	Azimuth	...	...	+ 11·597

The dispersion of these errors by the Simultaneous Reduction of the North-East Quadrilateral was effected by the method of least squares, as described in Part I of Vol. VII.

The trigonometrical determinations of the heights of the stations of this Series above the mean sea level have been corrected by connecting the stations, wherever possible, with the lines of spirit levels which have been executed of late years in the course of operations in the Trigonometrical and Revenue branches of the Survey Department. A list of the stations which have been so connected will be found on page 43—K. [of Vol. VII]; a statement of the several sections into which the series is divided, as well as the method of adjustment employed is given in detail on page 38 of Part I of Vol. VII. It will here suffice to state that the spirit levels shew that occasional errors of a magnitude which reaches a maximum of 14·5 feet between contiguous stations were made in the trigonometrical determinations; and that the cumulative error in the entire Series, from origin to terminus, is about 52 feet. This large accumulation of error is unquestionably due to the great lengths of the sides of the triangles in the plains, which has already been shewn to have been a cause of great delay in the progress of the operations, and which frequently compelled the measurement of the vertical angles to be made at other times than that of minimum refraction. An inspection of the values of the refraction—in seconds, and in decimals of the ‘contained’ arc—which are given at pages 38—K. to 43—K. [of Vol. VII] will show many instances of greatly abnormal variations of refraction, such as are fatal to accuracy in the resulting determinations of height.

Secondary Triangulation.

The secondary triangulation accomplished in connection with this Series was mainly executed by the measurement—with the large theodolites—of the angles at the principal stations, to the surrounding secondary stations and other prominent objects, and by the measurement—with smaller theodolites—of the angles at the secondary stations which were required for combination with the former, in order to complete the secondary and minor triangles. The whole is shown in the chart accompanying the Synoptical Volume for this Series, in which volume all the requisite numerical details of angles and side-lengths, and of latitudes, longitudes, azimuths and heights, are given, both for the secondary stations and for the ‘intersected’ but unvisited points.

Most of the angles at the secondary stations were measured by Mr. Mulheran, who was specially commended for the vigour with which he succeeded in laying down the very large number of points between the parallels of $25^{\circ}\frac{3}{4}$ and $27^{\circ}\frac{1}{4}$ in a single field season, 1836-37.

Compiled, with Addenda by the Surveyor General, by

MUSSOOREE: }
August 1881. }

C. WOOD,
Surveyor 2nd Grade.

RANGIR MERIDIONAL SERIES.

1—K.

ALPHABETICAL LIST OF STATIONS.

Atária	XI.	Kalsán	XIX
(of North-East Longitudinal Series).			
Atsu	XVI.	Kanwa	XII.
Bhoraj	IV.	Kasrak	XXVIII.
Birona	XVIII.	Kusmár	I.
Bisungarh	XX.	Mamdábád	XXII.
Chandanpúr	XXI.	Manang	VII.
Chandla	III.	Máo	XXIV.
Dálípúr	II.	Nagonáth	VIII.
Datiára	V.	Nipenfa	XIII.
Dháka	XXVI.	Phára	IX.
Fateganj	XXXI.	Pothári	XXIII.
Gajnera	XXX.	Rangír	X.
Gandaspúr	XV.	(of Calcutta Longitudinal Series).	
Gokalphára	X.	Saipúr	XXVII.
Gura	XI.	Seontára	XVII.
Guri	XXV.	Sísgarh	X.
Husápúra	XIV.	(of North-East Longitudinal Series).	
Janjiri	XXIX.	Thanela	VI.
		Tinsmál	VII.
		(of Calcutta Longitudinal Series).	

RANGIR MERIDIONAL SERIES.

NUMERICAL LIST OF STATIONS.

VII	.	.	.	Tinsmál.	XVII	.	.	.	Seontára.
	.	.	.	(of Calcutta Longitudinal Series).		.	.	.	
X	.	.	.	Rangír.	XVIII	.	.	.	Birona.
	.	.	.	(of Calcutta Longitudinal Series).		.	.	.	
I	.	.	.	Kusmár.	XIX	.	.	.	Kalsán.
II	.	.	.	Dálípúr.	XX	.	.	.	Bisungarh.
III	.	.	.	Chandla.	XXI	.	.	.	Chandanpúr.
IV	.	.	.	Bhoraj.	XXII	.	.	.	Mamdábád.
V	.	.	.	Datiára.	XXIII	.	.	.	Pothári.
VI	.	.	.	Thanela.	XXIV	.	.	.	Máo.
VII	.	.	.	Manang.	XXV	.	.	.	Guri.
VIII	.	.	.	Nagonáth.	XXVI	.	.	.	Dháka.
IX	.	.	.	Phára.	XXVII	.	.	.	Saipúr.
X	.	.	.	Gokalphára.	XXVIII	.	.	.	Kasrak.
XI	.	.	.	Gura.	XXIX	.	.	.	Janjiri.
XII	.	.	.	Kanwa.	XXX	.	.	.	Gajnera.
XIII	.	.	.	Nipeníá.	XXXI	.	.	.	Fateganj.
XIV	.	.	.	Husápúra.	X	.	.	.	Sísgarh.
XV	.	.	.	Gandaspúr.		.	.	.	(of North-East Longitudinal Series).
XVI	.	.	.	Atsu.	XI	.	.	.	Atária.
						.	.	.	(of North-East Longitudinal Series).

RANGIR MERIDIONAL SERIES.

DESCRIPTION OF PRINCIPAL STATIONS.



Of the 31 Principal Stations composing this Series, the 10 southernmost are on hills, and are low solid platforms carrying a mark engraved either on the rock *in situ* or (presumably) on a stone imbedded at about the level of the ground: above this mark one or more other mark-stones, with the usual engraved circle and dot, are inserted in the platform, the uppermost being flush with the structure. When the Series entered the plains, artificial elevations had to be constructed. These special erections at the first 9 stations consisted of perforated columns of masonry of the following description;—*foundation* a foot or two in depth and having a mark-stone sunk flush with its surface; *plinth* either $4\frac{1}{2}$ or $5\frac{1}{2}$ feet square and $3\frac{1}{2}$ feet high; *shaft* composed of two or more cylinders with diameters varying from 4 or 5 feet at base to 3 feet at summit; surmounted in nearly all instances with *capitals* 4 feet in diameter and about 3 feet in depth; an aperture about a foot across passed vertically through the column to admit of plumbing over the mark-stone to which access was obtained by means of a vaulted passage in the plinth. For the remainder of the Series the construction of these columns of masonry was slightly modified, and the structures, generally speaking, were built as follows;—*foundation* 3 feet in depth; *plinth* 9 feet square and 2 feet high having a mark-stone sunk flush with its surface; *basement* circular, 7 feet in diameter and 5 feet high; *shaft* starting in a curve from the edge of the basement and subsequently continued in the form of a truncated cone with a diameter of 3 feet at summit; surmounted with a *capital* and having an aperture as before described. For the accommodation of the observatory tent, temporary scaffolding platforms were erected around the columns: when the last 2 stations were subsequently visited in the course of the operations of the North-East Longitudinal Series, the columns were surrounded with a *kacha* tower about 14 feet in diameter at top. Exceptions to the general rules in point of construction of the towers will be found at the stations of Bisungarh and Muhammadabad, in the descriptions of which such details as are forthcoming have been embodied.

The following descriptions have been compiled from those given in the original MS. General Report and other original records of this Series, supplemented in respect to the neighboring villages by information obtained from the Revenue and Topographical Survey maps of the country traversed. The information as to the local sub-divisions in which the several stations occur has been derived where practicable from the latest Annual Reports received from the District officers to whose charge the stations have been committed.

VII.—(*Of the Calcutta Longitudinal Series*). Tinsmál Hill Station, lat. $24^{\circ} 7'$, long. $79^{\circ} 2'$ —observed at in 1826, 1833, 1834 and 1864—is situated on the top of a very conspicuous hill about three-quarters of a

mile S. by E. of the village of Tinsua from which it is approached: thána, tahsíl and pargana Banda, district Saugor.

The pillar is solid and has three marks, one engraved on the rock *in situ* and the others at 3·5 and 8·5 feet above it respectively. The station of 1826 was revisited in 1833 for the purpose of originating the Budhon Meridional Series, when its height was increased by 8·5 feet. It was again visited in 1834 to originate the Rangir Meridional Series, but no further alteration in its construction appears to have been made. On visiting it in 1864, the upper mark being found displaced, a new mark was substituted in the normal of the lower mark. The distances and bearings of surrounding villages are:—Dalpatpur, from which a road leads up to the station, 1·5 miles N.E.; Lamnau 1·3 miles towards the W.; and the deserted village of Tinsi 0·8 mile S.S.E.

X.—(*Of the Calcutta Longitudinal Series*). Rangir Platform Station, lat. $24^{\circ} 0'$, long. $79^{\circ} 28'$ —observed at in 1827, 1834 and 1864—is situated in a ploughed field about half a mile S.E. of the little village of Rangir: thána Narsingharh, tahsíl and district Damoh.

The pillar is solid and contains two marks, the upper being 5 feet above the lower. The station of 1827 was revisited in 1834 for the purpose of originating the Rangir Meridional Series, and was then raised 4 feet in height. On again visiting it in 1864 the station was found destroyed, and although a mark-stone was discovered amongst the debris it was impossible to say if this mark was in its original position. The new station established in 1864 is identical in height with the old station and it also agrees as closely in position with the latter, as this point could be conjectured. The distances and bearings of surrounding places are:—Narsingharh town $2\frac{1}{4}$ miles W. by S.; Murhiya village 1·4 miles S.E.; and the town of Sítanagar 3·1 miles N.N.E.

I. Kusmár Hill Station, lat. $24^{\circ} 15'$, long. $79^{\circ} 23'$ —observed at in 1826, 1834 and 1864—is situated on a low range of hills which extend from Panna towards Saugor, and is named after the village of Kusmár which lies at the foot of the hill at a distance of about a mile N. by W. of the station: pargana Baxwáho of the Panna state.

The station consists of a platform enclosing a central solid pillar of masonry 7·2 feet high which has a mark-stone at its upper surface, another at 2·9 feet below this, and a third at the level of the ground. The station of 1826 was revisited in 1834 in the course of the operations of the Rangir Meridional Series, and again in 1864 in the prosecution of the Calcutta Longitudinal Series, but no alteration in its construction appears to have been made on either of the two latter occasions. The distances and bearings of surrounding places are:—Hirapur iron mine about 11 miles towards the N.W.; Baxwáho town 3 miles W.; Machandri village 1·4 miles N.; and Semra village 1·5 miles S.S.W.

II. Dálípur (*Dálípur*) Hill Station, lat. $24^{\circ} 27'$, long. $79^{\circ} 12'$ —observed at in 1834—is situated on the northern face of the Vindhyaçal range and is named after the small hill fort of Dálípur which stands at the base: pargana Bijáwar of the Bijáwar state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding places are:—Hirapur iron mine 6·6 miles S.E. by S.; Patera village 0·6 mile W. by S.; and Singhpur village 2·7 miles E.N.E.

III. Chandla Hill Station, lat. $24^{\circ} 37'$, long. $79^{\circ} 30'$ —observed at in 1834—is situated on a hill so called, on the northern face of the Vindhyaçal range: pargana Bijáwar of the Bijáwar state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding places are:—Bijáwar town $2\frac{1}{2}$ miles E.N.E.; Gulgauj town on high road from Saugor to Cawnpore 8 miles N.W. by N.; and the villages of Andiáro and Pokhrela at 3 miles and 2·5 miles to the S.S.W. and W. respectively.

IV. Bhoraj Hill Station, lat. $24^{\circ} 50'$, long. $79^{\circ} 6'$ —observed at in 1834—is situated on a lofty range, on which stands a temple dedicated to the Hindu goddess Bhawáni: pargana Baldeogarh of the Orchha or Tehri state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface and a mark engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Serkunpur about 0·7 mile N. by E.; Dauhit-Singh-ka-pura 0·6 mile S.W.; and Khena 1·5 miles E.

V. Datiára Hill Station, lat. $25^{\circ} 6'$, long. $79^{\circ} 25'$ —observed at in 1834—is situated on the highest point of a cluster of hills, along whose western base the Dhasán river winds: thána Ajnár, tahsíl and pargana Panwári, district Hamírpur.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface and a mark engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Narwara 0·5 mile N. by W.; Purainia 1·6 miles S.E. by S.; Daurea 1·7 miles E. by S.; and the town of Gerauli 2·1 miles S.W. by S.

VI. Thanela Hill Station, lat. $24^{\circ} 58'$, long. $79^{\circ} 47'$ —observed at in 1834—is situated on a detached hill, at the foot of which lies the village of Sela: pargana Chhatarpur of the Chattarpur state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Mau 0.9 mile N.W.; Naddia 3.1 miles E. by S.; and Kotah 1.6 miles S.S.E.

VII. Manang Hill Station, lat. $25^{\circ} 17'$, long. $79^{\circ} 46'$ —observed at in 1834—is situated on the summit of a hill so called, at the foot of which—and due south of the station—lies the village of Salat Malat: jagir Garhali which adjoins thána Kulpahár, tahsíl and pargana Panwári of the Hamírpur district.

The station consists of a circular paka platform, 16 feet in diameter, enclosing a central solid pillar of masonry which has a mark-stone at its upper surface and a mark engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Narari 1.8 miles S.E. by E.; Larpur 1.3 miles N.W. by N.; Kamálpur 1.5 miles W.; Supa 2.9 miles N.E.; and a Revenue Survey Bench-Mark fixed on a rock 1.04 chains S. by W.

VIII. Nágonáth (*Nagonáth*) Hill Station, lat. $25^{\circ} 27'$, long. $79^{\circ} 23'$ —observed at in 1834 and 1836—is named after the Hindu deity Nágonáth whose temple stands on the same hill along the eastern side of which the river Dhasán winds: pargana Garotha, district Jhánsi.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of adjacent villages are:—Gura 1.1 miles S.W. by S.; and Karora about 1.2 miles N.W.

IX. Phára Hill Station, lat. $25^{\circ} 41'$, long. $79^{\circ} 43'$ —observed at in 1834 and 1836—is situated on a hill, on which at the distance of a few yards S.S.E. of the station a temple—dedicated to the Hindu deity Mahádeo—is erected; it is named after the village of Phára or Pabra which lies at the foot of the hill and is due east of the station: thána Jariya, tahsíl and pargana Ráth, district Hamírpur.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Umaría 2 miles W. by N.; Jarmauli 1.6 miles N.N.W.; Turnan 2 miles E.S.E.; and Chilli 1.4 miles S.W.

X. Gokulphára (*Gokalphára*) Hill Station, lat. $25^{\circ} 46'$, long. $79^{\circ} 20'$ —observed at in 1836—is situated on the highest of several eminences clustered in this vicinity, and is named after the small village of Gokulphára which lies at the western foot of the hill: in the Gursarai state within pargana Garotha of the Jhánsi district.

The station consists of a platform enclosing a central solid pillar of masonry 12 feet high: it has a mark-stone at its upper surface and a mark engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Gogul 0.6 mile N. by W.; Douri 2.6 miles W. by S.; Dhanora 2.1 miles S.S.E.; and Dhanori 2 miles E. by S.

XI. Gura Tower station, lat. $25^{\circ} 58'$, long. $79^{\circ} 36'$ —observed at in 1837—is situated on a slight eminence and is named after the ruined village of Gura: thána Orá, tahsíl Kálpi, district Jálaun.

The station consists of a perforated masonry column $5\frac{1}{2}$ feet square to a height of $3\frac{1}{2}$ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 33.3 feet above the mark-stone imbedded at the level of the ground and into which a brass plug with the mark engraved thereon has been countersunk. The distances and bearings of surrounding villages are:—Kurmír 1.8 miles N.N.W.; Burdar 1 mile E. by N.; Kurwi Buzurg 1.6 miles S.S.W.; and Dhani Buzurg 2.5 miles W.

XII. Kanwa Tower Station, lat. $26^{\circ} 4'$, long. $79^{\circ} 19'$ —observed at in 1837—is situated on the terreplein and close to the N.W. tower of the fort of Kanwa distant about 6 miles S.W. by S. of the town and station of Jálaun: thána, tahsíl, pargana and district Jálaun.

The station consists of a perforated masonry column $4\frac{1}{2}$ feet square to a height of $3\frac{1}{2}$ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 28.3 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Lachura 1.5 miles N.W.; Purwári 1.4 miles N.E.; Dunora 2.8 miles S.E.; and Bhair 2 miles W.S.W.

XIII. Nipania (*Nipenta*) Tower Station, lat. $26^{\circ} 14'$, long. $79^{\circ} 38'$ —observed at in 1837—is situated on the right bank of the Jumna, and stands on the lands of the village of Pal Sarania at a distance of $1\frac{1}{2}$ miles N. by W. of the village of Nipania: thána Nipania, tahsíl Kálpi, district Jálaun.

The station consists of a perforated masonry column $5\frac{1}{2}$ feet square to a height of $3\frac{1}{2}$ feet, and circular thereafter—the

diameter at top of shaft being 3 feet: the summit of the column is 39 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Simra Shaikhpur 1 mile E.S.E.; Sikunni 1.9 miles S.; and Sunni Ser 1.5 miles W. by N.

XIV. Husapura (*Husápúra*) Tower Station, lat. $26^{\circ} 22'$, long. $79^{\circ} 21'$ —observed at in 1837—is situated in an open field due S. of the village of Husapura, and distant about $2\frac{1}{2}$ miles from the right bank of the Jumna: thána Gohan, tahsíl Mádhogarh, district Jálaun.

The station consists of a perforated masonry column $5\frac{1}{2}$ feet square to a height of $3\frac{1}{2}$ feet, and circular thereafter—the diameter at top of shaft being 3 feet: the summit of the column is 33.8 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Pánípur 0.6 mile S.W.; Magtoa 1.1 miles due W.; Shaikhpur Ahir 0.5 mile E.; and Nímgau 1.3 miles S.E. by E.

XV. Gandaspur (*Gandaspúr*) Tower Station, lat. $26^{\circ} 28'$, long. $79^{\circ} 38'$ —observed at in 1837—is situated on a low mound which stands on the west side of the village of Gandaspur, and is distant about three-quarters of a mile from the right bank of the Sengar nadi: thána and pargana Derapur, district Cawnpore.

The station consists of a perforated masonry column $4\frac{1}{2}$ feet square to a height of $3\frac{1}{2}$ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 28 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of neighboring villages are:—Napallapur 1.3 miles E.; and Mahásinghpur 0.8 mile S.E.

XVI. Atsu Tower Station, lat. $26^{\circ} 35'$, long. $79^{\circ} 24'$ —observed at in 1837—is situated on the elevated platform which surrounds the exterior of the N.E. tower of the fort of Atsu or Arsu: taluka Bhareh, thána Ajítmal, tahsíl and pargana Auraiya, district Etáwah.

The station consists of a perforated masonry column $4\frac{1}{2}$ feet square at base to a height of $3\frac{1}{2}$ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 25.7 feet above the mark-stone imbedded at the level of the platform. The distances and bearings of surrounding villages are:—Mahíuddín 0.6 mile S.; Durhaspur 1.6 miles W.; Alamgirpur 0.9 mile N.N.W.; and Rasúlpur 1 mile N.E. by N.

XVII. Seontára Tower Station, lat. $26^{\circ} 42'$, long. $79^{\circ} 38'$ —observed at in 1837—is situated on the western solid tower of a small brick fort which is built on an extensive elevated mound (about 50 feet in height) down the eastern slope of which lies the village of Seontára, the western declivity being washed by the kind or Arind nadi: thána Bela, tahsíl and pargana Bidhúna, district Etáwah.

The station consists of a perforated masonry column $4\frac{1}{2}$ feet square at base to a height of $3\frac{1}{2}$ feet, and circular thereafter—the diameter at top of shaft being 4 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 16.8 feet above the mark-stone imbedded at the level of the tower. The distances and bearings of surrounding villages are:—Dunwama 1 mile W.N.W.; Rámpur 1.1 miles N.E.; Baryáramau 0.9 mile E.S.E.; and Ekghara 1.5 miles W.S.W.

XVIII. Birona Tower Station, lat. $26^{\circ} 51'$, long. $79^{\circ} 25'$ —observed at in 1837 and 1840—is situated on the terreplein between the outer and inner walls of the fort in the village of Birona Kalán: thána Kudarkot, tahsíl and pargana Bidhúna, district Etáwah.

The station consists of a perforated masonry column $4\frac{1}{2}$ feet square to a height of $3\frac{1}{2}$ feet, and circular thereafter—the diameter at top of shaft being 3 feet: the summit of the column is 23.2 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Shaikhpur 1.6 miles N.W.; Morcha 1.3 miles N. by E.; Bulpur 2.4 miles S.E.; and Ujluhrh 1.6 miles S.S.W.

XIX. Kalsán Tower Station, lat. $26^{\circ} 57'$, long. $79^{\circ} 41'$ —observed at in 1837 and 1840—is situated on the S.W. corner of an elevated mound in the village of Kalsán: pargana Tirwa, district Farrukhabad.

The station consists of a perforated masonry column $4\frac{1}{2}$ feet square at base to a height of $3\frac{1}{2}$ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 23.1 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Mírpura 1.6 miles W.; Bagulhai 2.1 miles N.N.E.; Munkapur 2.7 miles E.; and Rámpur 1.3 miles S.

XX. Bisungarh Tower Station, lat. $27^{\circ} 7'$, long. $79^{\circ} 27'$ —observed at in 1839 and 1841—is situated on a narrow mound to the south of the *bárádari* (summer-house) and outside the fort of Bisungarh or Binsia: pargana Chhibramau, district Farrukhabad.

The station consists of a perforated masonry column $5\frac{1}{2}$ feet square to a height of 1 foot, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 24 feet above the

mark-stone which is imbedded at 1 foot above the level of the ground. The distances and bearings of surrounding villages are:—Surdamai 0·9 mile N. by E.; Astutabad 1·2 miles E.; and Shaikhpur 2·3 miles S.E.

XXI. Chandanpur (*Chandanpur*) Tower Station, lat. $27^{\circ} 14'$, long. $79^{\circ} 41'$ —observed at in 1839 and 1841—is situated in an open field, and stands on the northern bank of a small tank at a distance of about 350 yards S.W. of the village of Chandanpur: pargana Bhojpur, district Farrukhabad.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The Ganges flows about 1 mile N.E. of the station, and the high road from Farrukhabad to Cawnpore passes within a mile to the west of it; the distances and bearings of surrounding villages are:—Rájipur 0·6 mile W.; Singirampur 0·9 mile N.E.; and Mukrandnagar 0·8 mile S. by E.

XXII. Muhammadabad (*Mamdábád*) Tower Station, lat. $27^{\circ} 18'$, long. $79^{\circ} 28'$ —observed at in 1841—is situated on the east bastion of the fort of Muhammadabad, and is distant about 400 yards W.S.W. of the town of that name: thána and pargana Muhammadabad, district Farrukhabad.

The station consists of a tower of burnt bricks and mud cement 24 feet square at base and 18 feet square at top, enclosing a central isolated pier of masonry $3\frac{1}{2}$ feet in diameter and 16·7 feet high—with a foundation of $4\frac{1}{2}$ feet—which is marked in the usual manner. The high road from Agra to Fatehgarh passes about 600 yards E. of the station; and the distances and bearings of neighboring villages are:—Nandu Takipur 0·7 mile S.W.; and Kabirpur the same distance N.W. by N.

XXIII. Pothári Tower Station, lat. $27^{\circ} 23'$, long. $79^{\circ} 27'$ —observed at in 1838, 1839 and 1841—is situated on an elevated mound in the village of Pothári: pargana Muhammadabad, district Farrukhabad.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·6 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Karanpur 0·6 mile E. by N.; Chandtokh 1·4 miles S.E.; Buruh 2 miles S.W.; and Pitua 2·1 miles W. by S.

XXIV. Mau (*Máo*) Tower Station, lat. $27^{\circ} 30'$, long. $79^{\circ} 43'$ —observed at in 1838—is situated on a high mound in the village of Mau which lies on the left bank of the Rámanga: pargana Imratpur, district Farrukhabad.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38·2 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Maulaganj 0·7 mile N.W.; Sháhjahánpur 1·1 miles E.; and Aligarh 0·9 mile S.S.W.

XXV. Guri Tower Station, lat. $27^{\circ} 40'$, long. $79^{\circ} 29'$ —observed at in 1837 and 1838—is situated on a small mound in the village of Guri distant about 2 miles N. of the Ganges: pargana Meherabad, district Sháhjahánpur.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·9 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Usmánpur 0·4 mile S.W.; Lakhanpur 0·4 mile N. by E.; and Pitampur 1·7 miles S.E. by S.

XXVI. Dháka Tower Station, lat. $27^{\circ} 45'$, long. $79^{\circ} 43'$ —observed at in 1838—is situated on a low sandy elevation in an open field to the west of the village of Dháka: pargana Meherabad, district Sháhjahánpur.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·7 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding places are:—Jalálabad town 2·2 miles S.S.W.; Malupur 0·9 mile W.; Juguah 0·9 mile N.E. by N.; and Gularia 0·8 mile S.S.E.

XXVII. Saipur (*Saipur*) Tower Station, lat. $27^{\circ} 55'$, long. $79^{\circ} 27'$ —observed at in 1838—is situated on an elevated mound said to be the site of the ancient village of Saipur: thána and pargana Hazratpur, tahsíl Dátaganj, district Budaun.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages

are:—Chungosi 0·9 mile N.W.; Chithri 0·8 mile S.E.; Sikutia about 1 mile S.W.; and Garhia 1·6 miles E.

XXVIII. Kasrak Tower Station, lat. $28^{\circ} 3'$, long. $79^{\circ} 42'$ —observed at in 1838—is situated on the crest of an elevated mound 600 yards south of the village of Kasrak: pargana Mírānpur Katra, district Shāh-jahānpur.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The high road from Farrukhabad to Bareilly passes about half a mile west of the station; and the distances and bearings of surrounding places are:—the town of Mírānpur Katra 1·6 miles S.; Kusak village 1·2 miles N. by W.; and Sahupur 0·5 mile N.E.

XXIX. Janjīri Tower Station, lat. $28^{\circ} 11'$, long. $79^{\circ} 27'$ —observed at in 1838—is situated on a mound in the village of Janjīri, and is distant 2 miles from the right bank of the Rāmganga: pargana Ballia, district Bareilly.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·8 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Kiratpur 0·6 mile W. by N.; Turkuni 1·2 miles N.E.; and Himpatpur Behāripur 0·8 mile E.

XXX. Gajnera Tower Station, lat. $28^{\circ} 20'$, long. $79^{\circ} 41'$ —observed at in 1838 and 1839—is situated on a mound about 350 yards south of the village of Gajnera the eastern extremity of which is washed by the Kailās nadi: pargana Farīdpur, district Bareilly.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding places are:—the town of Bhuta 2·2 miles W.; Suraur village 1·4 miles N.N.E.; and Khurduha 0·8 mile S.E.

XXXI. Fatehganj (*Fateganj*) Tower Station, lat. $28^{\circ} 27'$, long. $79^{\circ} 21'$ —observed at in 1838 and 1839—is situated on a mound distant about 500 yards S.E. of the town of Fatehganj on the high road from Bareilly to Moradabad; this locality is memorable in the annals of Rohilkhand as the scene of the last struggle made (in 1794) by the Pathāns under their leader Najū Khān against the power of the British: pargana Karor, district Bareilly.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·9 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. In a large enclosure about 200 yards E. of the station are the tombs of the Pathāns who fell in the struggle, and a cenotaph erected on the spot by order of Government commemorates their heroism; the mausoleum of their brave leader stands at about 40 yards from the station: the distances and bearings of surrounding villages are:—Unāsi 0·9 mile W.; Ballia 2·5 miles E.; and Rukumpur 1·3 miles S.E.

X.—(*Of the North-East Longitudinal Series*). Sísgarh Tower Station, lat. $28^{\circ} 44'$, long. $79^{\circ} 21'$ —observed at in 1839 and 1851—is situated on a platform in the centre of the fort which stands on a mound raised considerably above the general level of the surrounding country, and immediately south of the large village of Sísgarh: pargana Sīrsāwān, district Bareilly.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central perforated pillar of masonry whose summit is 38·0 feet above the mark-stone which * is 2 feet higher than the level of the ground. The station of 1839 was a column standing 38·3 feet above the mark-stone and similar in construction to the stations which precede; it was found, when revisited in the course of the operations of the North-East Longitudinal Series, to be so deflected as to necessitate the dismantling of a considerable portion of it; it was then rebuilt to its present height and enclosed in a *kacha* tower—the upper 5 feet of it being isolated therefrom: at the same time a second mark 1·8 inches N.W. by W. of the former one was cut on the original mark-stone. The road from Bareilly to Almora passes by the station; and the distances and bearings of surrounding villages are:—Ghulāmganj 1·4 miles W.; Tigri 1·4 miles E.N.E.; and Girdhārpur 0·6 mile S.

XI.—(*Of the North-East Longitudinal Series*). Atária Tower Station, lat. $28^{\circ} 38'$, long. $79^{\circ} 38'$ —observed at in 1839, 1843 and 1851—is situated on a mound near the east bank of the Baigul nadi, and distant about half a mile S.W. of the village of Atária: pargana Riehha, district Bareilly.

The station consists of a tower of unburnt bricks and mud cement, about 14 feet in diameter at top, enclosing a central

* In the description of this station given in the North-East Longitudinal Series p. 7—I, the height of this mark-stone above ground level is stated at 0 feet as erroneously entered in the field records of that series.

perforated pillar of masonry whose summit is 37·8 feet above the mark-stone which* is 2 feet higher than the level of the ground. The station of 1839 was a column 37·3 feet above the mark-stone and similar in manner of construction to the stations which precede; it was found greatly deflected when the observations on the Rangir Series came to be made so that the mark-stone in the basement could not be plumbed from the summit of the tower; the point of observation was indicated by the intersection of the diagonals of a quadrilateral each angular point of which was denoted by a dot engraved on an iron bolt imbedded in an external masonry pillar built in the adjacent fields. When the station was revisited in 1843 in the course of the operations of the North Connecting Series, the pillar was found still further deflected, and no trace of the four external pillars was forthcoming; the instrument was accordingly plumbed over a mark engraved on a new mark-stone let into the basement. On again visiting the station in 1851 in the course of the operations of the North-East Longitudinal Series, it was found necessary to dismantle a considerable portion of the pillar, which was then rebuilt to its present height and enclosed in a *kacha* tower: at the same time a second mark 3·5 inches W.N.W. of the mark of 1843 was engraved on the mark-stone of that year. The distances and bearings of surrounding villages are:—Ináyatpur 0·9 mile N.E.; Sayyidpur 1·2 miles E.; Uteria Mádhopur 0·5 mile S.S.W.; and Jumunián 0·8 mile N.W.

* In the description of this station given in the North-East Longitudinal Series p. 7—J, the height of this mark-stone above ground level is stated at 0 feet as erroneously entered in the field records of that series.

July 1877.

J. B. N. HENNESSEY,

In charge of Computing Office.

RANGIR MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. TRIANGLES.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
1	Tinsmál, VII	"	° ' "			
	Rangir, X	'90	37 36 19'43	4'9667210	92623'5	17'542
	Kusmár, I	'90	54 24 15'62	5'0914027	123424'9	23'376
2	Tinsmál, VII	'90	87 59 24'95	5'1809676	151693'7	28'730
	Kusmár, I	'89	44 20 35'26	4'9830826	96179'5	18'216
	Dálípur, II	'90	71 53 48'36	5'1165854	130793'3	24'771
3	Kusmár, I	'89	63 45 36'38	5'0914027	123424'9	23'376
	Dálípur, II	'86	55 51 12'69	5'0620943	115370'4	21'850
	Chandla, III	'87	80 31 15'94	5'1383004	137499'3	26'042
4	Dálípur, II	'86	43 37 31'37	4'9830826	96179'5	18'216
	Chandla, III	1'28	73 16 38'22	5'1995153	158312'6	29'983
	Bhoraj, IV	1'28	62 27 41'37	5'1660588	146574'6	27'760
5	Chandla, III	1'27	44 15 40'41	5'0620943	115370'4	21'850
	Bhoraj, IV	1'72	49 14 58'45	5'1575789	143740'4	27'224
	Datiára, V	1'73	74 12 4'19	5'2614378	182573'5	34'578
		1'73	56 32 57'36	5'1995153	158312'6	29'983

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Tinsmál, VII, and Rangir, X appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

PRINCIPAL TRIANGULATION. TRIANGLES.

11_K.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle			Distance		
						Log. feet	Feet	Miles
6	Chandla, III	1'67	45	37	4'34	5'1302726	134981'0	25'565
	Datiára, V	1'67	59	12	50'20	5'2101903	162252'1	30'730
	Thanela, VI	1'67	75	10	5'46	5'2614378	182573'5	34'578
7	Datiára, V	1'12	52	50	21'48	5'0756724	119034'4	22'544
	Thanela, VI	1'12	62	30	38'94	5'1222160	132500'0	25'095
	Manang, VII	1'13	64	38	59'58	5'1302726	134981'0	25'565
8	Datiára, V	1'19	64	59	46'94	5'1413570	138470'4	26'225
	Manang, VII	1'18	54	52	5'33	5'0967571	124956'0	23'666
	Nágonáth, VIII	1'18	60	8	7'73	5'1222160	132500'0	25'095
9	Manang, VII	1'36	59	42	20'81	5'1482905	140698'8	26'648
	Nágonáth, VIII	1'36	62	6	26'85	5'1584222	144019'8	27'276
	Phára, IX	1'35	58	11	12'34	5'1413570	138470'4	26'225
10	Nágonáth, VIII	1'10	60	8	12'15	5'1134245	129844'8	24'592
	Phára, IX	1'10	49	51	38'08	5'0586622	114462'2	21'678
	Gokulphára, X	1'11	70	0	9'77	5'1482905	140698'8	26'648
11	Phára, IX	'92	57	38	8'55	5'0640037	115878'7	21'947
	Gokulphára, X	'92	51	11	50'56	5'0290307	106913'0	20'249
	Gura, XI	'93	71	10	0'89	5'1134245	129844'8	24'592
12	Gokulphára, X	'82	53	8	37'10	5'0090505	102105'8	19'338
	Gura, XI	'82	61	36	58'17	5'0502590	112268'8	21'263
	Kanwa, XII	'82	65	14	24'73	5'0640037	115878'7	21'947
13	Gura, XI	'74	72	58	44'57	5'0721535	118073'8	22'362
	Kanwa, XII	'74	51	14	27'45	4'9835810	96290'0	18'237
	Nipania, XIII	'74	55	46	47'98	5'0090505	102105'8	19'338
14	Kanwa, XII	'80	53	40	13'44	5'0095020	102212'0	19'358
	Nipania, XIII	'80	57	47	39'64	5'0308130	107352'7	20'332
	Husapura, XIV	'81	68	32	6'92	5'0721535	118073'8	22'362
15	Nipania, XIII	'65	62	33	50'16	5'0028778	100664'8	19'065
	Husapura, XIV	'65	53	7	27'32	4'9577537	90730'6	17'184
	Gandaspur, XV	'65	64	18	42'52	5'0095020	102212'0	19'358
16	Husapura, XIV	'56	57	49	39'67	4'9550640	90170'4	17'078
	Gandaspur, XV	'56	51	16	10'60	4'9196119	83102'1	15'739
	Atsu, XVI	'56	70	54	9'73	5'0028778	100664'8	19'065
17	Gandaspur, XV	'53	61	21	24'19	4'9506117	89250'7	16'904
	Atsu, XVI	'52	56	11	10'36	4'9268275	84494'3	16'003
	Seontára, XVII	'53	62	27	25'45	4'9550640	90170'4	17'078
18	Atsu, XVI	'57	58	5	49'04	4'9537074	89889'2	17'024
	Seontára, XVII	'57	64	27	14'19	4'9801501	95532'3	18'093
	Birona, XVIII	'57	57	26	56'77	4'9506117	89250'7	16'904
19	Seontára, XVII	'59	65	16	18'08	4'9891122	97524'2	18'470
	Birona, XVIII	'59	57	53	0'58	4'9587495	90938'9	17'223
	Kalsán, XIX	'58	56	50	41'34	4'9537074	89889'2	17'024
20	Birona, XVIII	'62	58	33	56'52	4'9737188	94128'0	17'827
	Kalsán, XIX	'62	59	18	9'59	4'9770840	94860'2	17'966
	Bisungarh, XX	'63	62	7	53'89	4'9891122	97524'2	18'470

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
21	Kalsán, XIX	59	54 11 22'35	4'9456218	88231'1	16'710
	Bisungarh, XX	60	65 54 35'52	4'9970493	99322'9	18'811
	Chandanpur, XXI	60	59 54 2'13	4'9737188	94128'0	17'827
22	Bisungarh, XX	42	57 15 4'68	4'8929037	78145'5	14'800
	Chandanpur, XXI	42	51 1 0'74	4'8586874	72225'0	13'679
	Muhammadabad, XXII	43	71 43 54'58	4'9456218	88231'1	16'710
23	Chandanpur, XXI	16	15 31 41'51	4'4743603	29809'9	5'646
	Muhammadabad, XXII	16	119 54 1'32	4'9846574	96528'9	18'282
	Pothári, XXIII	16	44 34 17'17	4'8929037	78145'5	14'800
24	Bisungarh, XX	03	3 23 29'59	4'4743605	29809'9	5'646
	Muhammadabad, XXII	04	168 22 3'47	5'0068961	101600'6	19'243
	Pothári, XXIII	03	8 14 26'94	4'8586874	72225'0	13'679
25	Chandanpur, XXI	63	56 33 48'46	4'9699196	93308'2	17'672
	Pothári, XXIII	64	63 44 50'06	5'0012155	100280'3	18'992
	Mau, XXIV	64	59 41 21'48	4'9846574	96528'9	18'282
26	Pothári, XXIII	65	59 36 30'78	4'9876364	97193'3	18'408
	Mau, XXIV	65	64 29 11'49	5'0072719	101688'5	19'259
	Guri, XXV	64	55 54 17'73	4'9699196	93308'2	17'672
27	Mau, XXIV	55	53 37 20'37	4'9284610	84812'7	16'063
	Guri, XXV	56	59 3 37'91	4'9559387	90352'2	17'112
	Dháka, XXVI	56	67 19 1'72	4'9876364	97193'3	18'408
28	Guri, XXV	59	74 42 22'44	5'0288749	106874'7	20'241
	Dháka, XXVI	59	55 20 42'35	4'9597183	91141'9	17'262
	Saipur, XXVII	58	49 56 55'21	4'9284610	84812'7	16'063
29	Dháka, XXVI	74	51 57 55'46	4'9816288	95858'1	18'155
	Saipur, XXVII	74	66 36 48'60	5'0480725	111705'0	21'156
	Kasrak, XXVIII	74	61 25 15'94	5'0288749	106874'7	20'241
30	Saipur, XXVII	62	59 5 50'17	4'9765174	94736'5	17'943
	Kasrak, XXVIII	63	60 39 9'91	4'9833595	96240'9	18'227
	Janjiri, XXIX	62	60 14 59'92	4'9816288	95858'1	18'155
31	Kasrak, XXVIII	63	57 34 5'22	4'9753600	94484'4	17'895
	Janjiri, XXIX	64	64 37 20'37	5'0049315	101142'0	19'156
	Gajnera, XXX	64	57 48 34'41	4'9765174	94736'5	17'943
32	Janjiri, XXIX	74	70 35 32'13	5'0630680	115629'3	21'899
	Gajnera, XXX	74	58 59 27'31	5'0214986	105074'8	19'901
	Fatehganj, XXXI	73	50 25 0'56	4'9753600	94484'4	17'895
33	Gajnera, XXX	85	57 55 52'00	5'0410910	109923'6	20'819
	Fatehganj, XXXI	86	59 1 10'84	5'0461524	111212'2	21'063
	Atária, XI	86	63 2 57'16	5'0630680	115629'3	21'899
34	Fatehganj, XXXI	68	53 17 53'32	4'9723578	93833'5	17'771
	Atária, XI	68	56 46 40'45	4'9908090	97905'9	18'543
	Sísagarh, X	68	69 55 26'23	5'0410910	109923'6	20'819

NOTE.—Stations Sísagarh, X, and Atária, XI appertain to the North-East Longitudinal Series.

March 1879.

J. B. N. HENNESSEY,

In charge of Computing Office.

RANGIR MERIDIONAL SERIES.

SECONDARY TRIANGULATION. TRIANGLES.

PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle used	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
35	Tinsmál, VII Patharia Katara Tiled Building	91 52 8 12 37 46 h.s.	5.015242 4.355212 5.001418	103572 22658 100327	19.616 4.291 19.001	Inch 18 "	Kusmár, I Baksua Baksua Fort	17 46 54 79 51 33 h.s.	3.764463 4.272769 4.275734	5814 18740 18868	1.101 3.549 3.574	Inch 18 †
36	Tinsmál, VII Kusmár, I Niwar Tiled Building	24 49 40 13 27 39 h.s.	4.922413 4.666222 5.091403	83640 46368 123425	15.841 8.782 23.376	" " "	Kusmár, I Baksua Baksua Temple	18 28 58 66 10 12 h.s.	3.778714 4.238930 4.275734	6008 17335 18868	1.138 3.283 3.574	18 †
37	Kusmár, I Dálpur, II Baksua	60 40 40 10 42 54 h.s.	4.946855 4.275734 4.983083	88482 18868 96180	16.758 3.574 18.216	" " "	Kusmár, I Baksua Mangrai Building	20 55 48 115 32 26 h.s.	3.990631 4.393028 4.275734	9787 24719 18868	1.854 4.682 3.574	18 †
38	Kusmár, I Baksua Semra Fort	42 38 1 14 37 47 h.s.	4.181639 3.753237 4.275734	15193 5665 18868	2.877 1.073 3.574	18 †	Rangr, X Kusmár, I Bia Barari	26 24 40 71 3 59 82 31 21 h.s.	4.618603 4.946273 4.966721	41553 88364 92623	7.870 16.736 17.542	18 "†
39	Tinsmál, VII Kusmár, I Bakarua	21 17 27 140 25 34 h.s.	4.783744 4.847242 5.091403	60778 70346 123425	11.511 13.323 23.376	18 †	Kusmár, I Dálpur, II Hardua Tree	12 3 42 16 49 18 h.s.	4.619183 4.760600 4.983083	41609 57624 96180	7.880 10.914 18.216	18 "

NOTES.—1. Names followed by Roman numerals are those of Principal Stations. Station Tinsmál, VII appertains to the Calcutta Longitudinal Series of the South-East Quadrilateral.
2. The values of the side are given in the same line with the opposite angle. † Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
45	Kusmár, I Bakarua Hardua Tree	h.s.	4° 59' 32.02 4° 7' 00.60 4° 7' 83.74	39192 57624 60778	7.423 10.914 11.511	58	Dálpur, II Chandla, III Dhasán River Temple	41° 30' 54 59° 29' 18	4° 89' 15.46 5° 00' 54.21 5° 06' 29.94	77901 101256 115370	14.754 19.177 21.850	18 " "
46	Dálpur, II Hardua Tree Hasri	h.s.	57° 33' 22 4° 34' 61.15 4° 30' 89.14 4° 61' 91.83	35169 20366 41009	6.661 3.857 7.880	59	Chandla, III Datiára, V Chhatarpur Temple	29° 23' 9 34° 36' 24	4° 99' 86.11 5° 06' 21.07 5° 26' 14.38	99681 115374 182574	18.879 21.851 34.578	" "
47	Dálpur, II Hasri Shágarh Fort	h.s.	24° 41' 13 144° 50' 35 4° 30' 89.14	46809 64535 20366	8.865 12.223 3.857	60	Datiára, V Thandla, VI Chhatarpur Temple	24° 36' 28 43° 6' 6	4° 78' 35.18 4° 99' 86.11 5° 13' 02.73	60746 99681 134981	11.505 18.879 25.565	" "
48	Dálpur, II Hasri Bannora Fort	h.s.	40° 0' 4 48° 37' 44 4° 30' 89.14	13905 15288 20366	2.480 2.895 3.857	61	Chandla, III Chhatarpur Temple Bánsparh	65° 50' 46 64° 27' 25	5° 06' 69.84 4° 98' 09.91 5° 06' 21.07	116677 97519 115374	22.098 18.470 21.851	" +
49	Dálpur, II Chandla, III Bila	h.s.	24° 49' 9 34° 29' 40 120° 41' 11 4° 75' 06.06 4° 88' 06.76 5° 06' 29.94	56313 75976 115370	10.665 14.389 21.850	62	Chandla, III Thandla, VI Bánsparh	49° 36' 49 36° 51' 46	5° 09' 27.92 4° 98' 09.91 5° 21' 01.90	123820 97519 162252	23.451 18.470 30.730	18
50	Kusmár, I Dálpur, II Bila	h.s.	49° 37' 35 55° 42' 8 74° 40' 17 4° 88' 06.76 4° 91' 58.57 4° 98' 30.83	75976 82387 96180	14.389 15.604 18.216	63	Chandla, III Bánsparh Sánra	46° 44' 54 66° 1' 17	4° 88' 66.69 4° 98' 51.31 4° 98' 09.91	77032 96634 97519	14.589 18.302 18.470	" +
51	Kusmár, I Bila Gadakhár	h.s.	48° 58' 54 39° 42' 35 91° 18' 31 4° 79' 36.29 4° 72' 14.02 4° 91' 58.57	62177 52650 82387	11.776 9.972 15.604	64	Bánsparh Sánra Sonha	31° 6' 20 90° 59' 55	4° 81' 46.61 4° 59' 09.03 4° 88' 66.69	65262 39802 77032	12.360 7.538 14.589	+ +
52	Kusmár, I Bila Bádshápur	h.s.	50° 54' 36 72° 45' 10 4° 88' 55.19 4° 97' 53.89 4° 91' 58.57	76828 94534 82387	14.551 17.904 15.604	65	Bánsparh Sonha Tálgaon Hill Mark	45° 12' 32 116° 7' 5	4° 94' 55.89 5° 04' 77.49 4° 59' 09.03	88224 111022 39802	16.709 21.140 7.538	+ +
53	Chandla, III Bila Gopálpur	h.s.	27° 25' 26 102° 42' 58 4° 53' 05.10 4° 85' 64.60 4° 75' 06.06	33927 71855 56313	6.425 13.609 10.665	66	Thandla, VI Bánsparh Maniagarh	34° 6' 37 61° 45' 48 84° 7' 35	4° 84' 38.76 5° 04' 00.54 5° 09' 27.92	60803 109661 123820	13.220 20.769 23.451	18
54	Dálpur, II Chandla, III Pola	h.s.	24° 10' 23 38° 47' 12 4° 72' 46.17 4° 90' 23.6 5° 06' 29.94	53042 81140 115370	10.046 15.367 21.850	67	Chandla, III Thandla, VI Maniagarh	39° 20' 7 70° 58' 23	5° 04' 09.54 5° 21' 36.62 5° 21' 01.90	109661 163554 162252	20.769 30.976 30.730	" "
55	Kusmár, I Dálpur, II Pola	h.s.	52° 49' 40 56° 20' 54 4° 90' 23.6 4° 92' 82.18 4° 98' 30.83	81140 84765 96180	15.367 16.054 18.216	68	Chandla, III Chhatarpur Temple Nagron	15° 3' 51 156° 52' 37	4° 88' 28.46 4° 61' 47.58 5° 06' 21.07	76956 41187 115374	14.461 7.801 21.851	" +
56	Dálpur, II Bila Sempa Temple	h.s.	39° 57' 33 36° 26' 23 4° 70' 07.28 4° 66' 67.99 4° 88' 06.76	50303 46430 75976	9.508 8.794 14.389	69	Chandla, III Dhasán River Temple Nagron	66° 32' 43 81° 53' 34	4° 85' 84.55 4° 61' 47.58 4° 89' 15.46	72186 41187 77901	13.672 7.801 14.754	18 +
57	Dálpur, II Bila Khatoli Gateway	h.s.	26° 35' 9 86° 24' 9 4° 56' 74.42 4° 91' 57.16 4° 88' 06.76	36935 82367 75976	6.995 15.600 14.389	70	Chandla, III Nagron Bijáwar Temple	54° 30' 29 20° 29' 32	4° 54' 05.44 4° 17' 39.82 4° 61' 47.58	34717 14927 41187	6.575 2.827 7.801	18 +

† Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles				Log. feet	Feet	Miles	
71	Chandla, III Nagroa Bijawar Palace	h.s. 61 9 11 19 43 54	4 562738 4 148700 4 614758	36537 14083 41187	6 920 2 667 7 801	18	Putli Bakoára Gara Sandna Pai Temple	h.s. 52 59 45 48 4 10	4 605709 4 574931 4 695235	40338 37578 49572	7 640 7 117 9 389	18	Putli Bakoára Gara Sandna Pai Temple	h.s. 52 59 45 48 4 10	4 605709 4 574931 4 695235	40338 37578 49572	7 640 7 117 9 389	†
72	Chandla, III Nagroa Nárayanpur Fort	h.s. 51 16 32 70 48 17	4 578904 4 661876 4 614758	37923 45907 41187	7 182 8 604 7 801	18	Thanela, VI Karri Tilona Temple	h.s. 6 34 20 9 7 45	4 150899 4 292732 4 524629	14155 19621 33468	2 681 3 716 6 339	18	Thanela, VI Karri Tilona Temple	h.s. 6 34 20 9 7 45	4 150899 4 292732 4 524629	14155 19621 33468	2 681 3 716 6 339	†
73	Chandla, III Nagroa Gulganj Fort	h.s. 44 46 42 68 11 20	4 498425 4 618368 4 614758	31508 41531 41187	5 967 7 866 7 801	18	Thanela, VI Putli Bakoára Mankahri House	h.s. 57 43 45 53 6 15	4 287797 4 263008 4 331300	19100 18349 21444	3 674 3 475 4 061	18	Thanela, VI Putli Bakoára Mankahri House	h.s. 57 43 45 53 6 15	4 287797 4 263008 4 331300	19100 18349 21444	3 674 3 475 4 061	†
74	Chandla, III Nagroa Ragauni Fort	h.s. 18 27 39 114 55 21	4 253947 4 710908 4 614758	17945 51393 41187	3 399 9 734 7 801	18	Chandla, III Datiára, V Mau Saria Temple	h.s. 12 49 1 39 56 32	4 706505 5 168016 5 261438	50875 147237 182574	9 635 27 886 34 578	18	Chandla, III Datiára, V Mau Saria Temple	h.s. 12 49 1 39 56 32	4 706505 5 168016 5 261438	50875 147237 182574	9 635 27 886 34 578	18
75	Bhoraj, IV Datiára, V Sonár Hill Mark	h.s. 34 12 42 60 15 15	4 908830 5 097537 5 157579	81064 125180 143740	15 353 23 768 27 224	18	Chandla, III Datiára, V Palera Temple	h.s. 18 29 58 62 24 59	4 768383 5 214518 5 261438	58666 163877 182574	11 111 31 037 34 578	18	Chandla, III Datiára, V Palera Temple	h.s. 18 29 58 62 24 59	4 768383 5 214518 5 261438	58666 163877 182574	11 111 31 037 34 578	18
76	Datiára, V Manang, VII Seyah	h.s. 50 42 5 49 22 23	5 017624 5 009186 5 122216	104142 102138 132500	19 724 19 344 25 095	18	Datiára, V Thanela, VI Lughási Fort	h.s. 12 46 32 13 30 56	4 828588 4 852612 5 130273	67389 71222 134981	12 763 13 489 25 565	18	Datiára, V Thanela, VI Lughási Fort	h.s. 12 46 32 13 30 56	4 828588 4 852612 5 130273	67389 71222 134981	12 763 13 489 25 565	18
77	Thanela, VI Manang, VII Seyah	h.s. 55 54 29 15 16 38	5 017624 4 520285 5 075672	104142 33135 119034	19 724 6 276 22 544	18	Thanela, VI Manang, VII Malka Temple	h.s. 7 9 37 8 40 21	4 735455 4 818141 5 075672	54382 65787 119034	10 300 12 460 22 544	18	Thanela, VI Manang, VII Malka Temple	h.s. 7 9 37 8 40 21	4 735455 4 818141 5 075672	54382 65787 119034	10 300 12 460 22 544	18
78	Thanela, VI Seyah Karri	h.s. 109 54 37 35 14 45	4 736621 4 524629 4 520285	54528 33468 33135	10 327 6 339 6 276	18	Manang, VII Phára, IX Charkhári Fort	h.s. 22 59 50 9 6 11	5 024827 4 632234 5 158422	105883 42878 144020	20 054 8 121 27 276	18	Manang, VII Phára, IX Charkhári Fort	h.s. 22 59 50 9 6 11	5 024827 4 632234 5 158422	105883 42878 144020	20 054 8 121 27 276	18
79	Thanela, VI Chhatarpur Temple Karri	h.s. 60 12 20 86 26 8	4 722786 4 524629 4 783518	52818 33468 60746	10 003 6 339 11 505	18	Nágonáth, VIII Phára, IX Túrah Shergarh	h.s. 19 8 35 9 4 52	4 989279 4 671697 5 148291	97562 46957 140099	18 478 8 893 26 648	18	Nágonáth, VIII Phára, IX Túrah Shergarh	h.s. 19 8 35 9 4 52	4 989279 4 671697 5 148291	97562 46957 140099	18 478 8 893 26 648	18
80	Thanela, VI Karri Putli Bakoára	h.s. 99 46 19 29 39 41 50 34 0	4 630459 4 331300 4 524629	42703 21444 33468	8 088 4 061 6 339	18	Nágonáth, VIII Túrah Shergarh Churári Temple	h.s. 51 10 38 95 28 15	4 823095 4 929525 4 671697	66542 85021 46957	12 603 16 102 8 893	18	Nágonáth, VIII Túrah Shergarh Churári Temple	h.s. 51 10 38 95 28 15	4 823095 4 929525 4 671697	66542 85021 46957	12 603 16 102 8 893	18
81	Karri Putli Bakoára Gara Sandna	h.s. 32 15 10 59 26 11	4 695235 4 422684 4 630459	49572 26466 42703	9 389 5 012 8 088	18	Nágonáth, VIII Túrah Shergarh Gogora Temple	h.s. 27 18 22 116 16 30	4 559712 4 850779 4 671697	36284 70922 46957	6 872 15 432 8 893	18	Nágonáth, VIII Túrah Shergarh Gogora Temple	h.s. 27 18 22 116 16 30	4 559712 4 850779 4 671697	36284 70922 46957	6 872 15 432 8 893	18
82	Thanela, VI Putli Bakoára Gara Sandna	h.s. 72 46 33 82 49 10 24 24 17	4 695235 4 711742 4 331300	49572 51492 21444	9 389 9 752 4 061	18	Nágonáth, VIII Túrah Shergarh Seonri Temple	h.s. 39 36 6 22 20 5	4 530463 4 305822 4 671697	33921 20222 46957	6 424 3 830 8 893	18	Nágonáth, VIII Túrah Shergarh Seonri Temple	h.s. 39 36 6 22 20 5	4 530463 4 305822 4 671697	33921 20222 46957	6 424 3 830 8 893	18
83	Karri Gara Sandna Mukána Hill Mark	h.s. 39 4 48 122 27 30	4 721697 4 848307 4 422684	52686 70519 26466	9 978 13 356 5 012	18	Nágonáth, VIII Gokulphára, X Rewábarti Temple	h.s. 29 16 1 27 10 21	4 827061 4 797463 5 058662	67152 62728 114462	12 718 11 880 21 678	18	Nágonáth, VIII Gokulphára, X Rewábarti Temple	h.s. 29 16 1 27 10 21	4 827061 4 797463 5 058662	67152 62728 114462	12 718 11 880 21 678	18

† Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
97	Nágonáth, VIII Phára, IX Rewábarti Temple	30 52 12 20 19 57	4° 06' 67.45 4° 79' 46.3 5° 148' 29.1	8 92628 62728 140699	17.543 11.880 26.648	110	Gokulphára, X Kanwa, XII Chirauli Fort	18 33 16 6 36 52	4° 92' 42.84 4° 48' 29.82 5° 05' 02.59	84001 30408 112269	15.909 5.759 21.263	Inch 18 "
98	Nágonáth, VIII Phára, IX Mardángalb Temple	8 7 46 9 50 13	4° 80' 95.73 4° 89' 16.95 5° 148' 29.1	64502 77928 140699	12.216 14.759 26.648	111	Gokulphára, X Badarwára Kalra	58 56 14 60 59 55	4° 56' 00.10 4° 57' 80.44 4° 57' 40.42	37069 37848 37501	7.021 7.168 7.102	" " +
99	Nágonáth, VIII Gokulphára, X Kacher Hill Mark	10 44 12 19 4 44	4° 63' 23.25 4° 87' 64.97 5° 05' 86.62	42887 75248 114462	8.123 14.252 21.678	112	Gokulphára, X Badarwára Perona Fort	44 21 43 94 42 55	4° 60' 23.67 4° 75' 63.01 4° 57' 40.42	40028 57056 37501	7.581 10.806 7.102	18 +
100	Gokulphára, X Kanwa, XII Badarwára	96 2 58 17 47 24	5° 08' 65.64 4° 57' 40.42 5° 05' 02.59	122057 37501 112269	23.117 7.102 21.263	113	Kanwa, XII Nipania, XIII Atária	24 53 51 34 3 41	4° 76' 35.54 4° 88' 75.26 5° 07' 21.54	58017 77184 118074	10.988 14.618 22.362	18 "
101	Gokulphára, X Badarwára Garwai Fort	39 10 6 66 4 25	4° 39' 00.36 4° 55' 05.72 4° 57' 40.42	24549 35528 37501	4.649 6.729 7.102	114	Gura, XI Kanwa, XII Atária	46 7 10 26 20 37	4° 88' 75.26 4° 67' 68.61 5° 00' 09.51	77184 47518 102106	14.618 9.000 19.338	" " "
102	Gokulphára, X Badarwára Sagauli Temple	14 58 24 144 48 40	4° 44' 77.68 4° 79' 05.16 4° 57' 40.42	28039 62540 37501	5.310 11.845 7.102	115	Gokulphára, X Kanwa, XII Himilia	37 39 33 122 58 39	4° 64' 71.16 4° 91' 25.72 5° 05' 02.59	44373 81766 112269	8.404 15.486 21.263	" " +
103	Gokulphára, X Badarwára Koratha Temple	32 33 29 26 54 45	4° 36' 97.59 4° 29' 45.95 4° 57' 40.42	23429 19706 37501	4.437 3.732 7.102	116	Gokulphára, X Gura, XI Himilia	43 29 40 102 43 30	4° 81' 98.89 4° 91' 25.72 5° 06' 40.04	66052 81766 115879	12.510 15.486 21.947	18 +
104	Gokulphára, X Badarwára Dhanora Temple	90 25 15 16 49 17	4° 59' 39.99 4° 05' 49.3 4° 57' 40.42	39264 11363 37501	7.436 2.152 7.102	117	Gura, XI Atária Muhammabad	84 59 18 40 15 48	4° 76' 31.75 4° 57' 27.74 4° 67' 08.61	57966 37607 47518	10.978 7.123 9.000	18 +
105	Gokulphára, X Badarwára Dakoli Temple	25 58 16 112 4 10	4° 39' 02.65 4° 71' 58.25 4° 57' 40.42	24562 51979 37501	4.652 9.844 7.102	118	Atária Himilia Muhammabad	32 11 14 66 38 30	4° 52' 67.84 4° 76' 31.75 4° 79' 51.35	33634 57966 62593	6.370 10.978 11.817	+
106	Gokulphára, X Kanwa, XII Dakoli Temple	70 4 42 27 19 49	5° 02' 71.01 4° 71' 58.25 5° 05' 02.59	106439 51979 112269	20.159 9.844 21.263	119	Gura, XI Muhammabad Baukhar	94 13 54 41 41 53	4° 75' 11.33 4° 59' 46.41 4° 57' 27.74	56381 39322 37607	10.678 7.447 7.123	18 +
107	Gokulphára, X Badarwára Kotra Temple	121 11 50 18 35 2	4° 69' 61.68 4° 26' 73.77 4° 57' 40.42	49678 18509 37501	9.409 3.505 7.102	120	Kanwa, XII Himilia Girthan Fort	22 23 40 110 45 54	4° 36' 50.21 4° 75' 49.50 4° 64' 71.16	23175 56879 44373	4.389 10.772 8.404	18 +
108	Gokulphára, X Badarwára Sayyidnagar Temple	79 31 17 31 53 10	4° 59' 77.84 4° 32' 79.13 4° 57' 40.42	39608 21277 37501	7.502 4.030 7.102	121	Gura, XI Baukhar Airo Fort	74 13 39 28 45 58	4° 58' 92.38 4° 288' 26.3 4° 59' 46.41	38836 19421 39322	7.355 3.678 7.447	18 +
109	Gokulphára, X Badarwára Chirauli Fort	77 29 42 43 50 12	4° 63' 20.70 4° 48' 08.2 4° 57' 40.42	42862 30408 37501	8.118 5.759 7.102	122	Gura, XI Baukhar Parasan Temple	58 2 44 65 36 52	4° 60' 29.75 4° 63' 75.6 4° 50' 40.41	40084 43029 39322	7.592 8.149 7.447	18 +

SECONDARY TRIANGULATION. TRIANGLES.

17 K.

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles	
123	Atária Himilia Bargaon Building	10 38 2 75 8 17	4° 06' 23.92 4° 78' 15.41 4° 79' 51.35	11545 60470 62393	2° 187 11° 453 11° 817	+	136	Gura, XI Karnar Sandi Fort	64 21 44 90 27 47	4° 28' 55.42 4° 33' 33.39 3° 96' 23.30	19433 21555 9109	3° 681 4° 082 1° 737	18 +
124	Gura, XI Atária Bargaon Building	70 25 12 61 49 0	4° 78' 15.41 4° 75' 20.03 4° 67' 68.61	60470 56572 47518	11° 455 10° 714 9° 000	18	137	Ata Karnar Itaura Temple	111 35 26 34 42 30	4° 68' 76.33 4° 47' 46.43 4° 46' 34.10	48712 29829 29068	9° 226 5° 649 5° 505	+
125	Atária Himilia Kinia Building	19 58 10 53 18 2	4° 34' 73.33 4° 71' 79.74 4° 79' 51.35	22250 52237 62393	4° 214 9° 893 11° 817	+	138	Gura, XI Ata Chamari	25 55 44 34 9 25	4° 22' 51.64 4° 33' 37.49 4° 52' 23.34	16794 21565 33292	3° 181 4° 084 6° 305	18
126	Kanwa, XII Atária Garar Mound (lamp)	33 14 33 26 49 24	4° 68' 86.34 4° 60' 41.16 4° 88' 75.26	48824 40102 77184	9° 247 7° 612 14° 618	18	139	Gura, XI Ata Banha Fort	34 38 9 52 23 50	4° 27' 75.39 4° 42' 17.84 4° 52' 23.34	18947 26411 33292	3° 588 5° 002 6° 305	18
127	Gura, XI Atária Garar Mound (lamp)	50 33 25 80 42 49	4° 68' 86.34 4° 79' 51.43 4° 67' 68.61	48824 62394 47518	9° 247 11° 817 9° 000	+	140	Kanwa, XII Himilia Kukargaon Building	47 12 21 60 29 26	4° 53' 37.46 4° 60' 78.25 4° 64' 71.16	34178 40534 44373	6° 473 7° 677 8° 404	18
128	Kanwa, XII Himilia Dantoli Temple	13 22 56 6 49 54	4° 47' 30.85 4° 18' 40.10 4° 64' 71.16	29722 15276 44373	5° 629 2° 893 8° 404	18	141	Gura, XI Nipania, XIII Kalpi	39 17 0 62 7 41	4° 79' 37.63 4° 93' 87.02 4° 98' 33.81	62196 86836 96290	11° 780 16° 446 18° 237	18
129	Nipania, XIII Atária Ata	32 3 54 86 59 22 60 56 44	4° 54' 69.60 4° 82' 13.64 4° 76' 35.54	35234 66277 58017	6° 673 12° 552 10° 988	18	142	Kanwa, XII Nipania, XIII Gijnor	29 48 8 20 12 6	4° 88' 42.38 4° 72' 61.03 5° 07' 21.54	76602 53223 118074	14° 508 10° 080 22° 362	18
130	Gura, XI Atária Ata	47 48 33 44 25 57 87 45 30	4° 54' 69.60 4° 52' 23.34 4° 67' 68.61	35234 33292 47518	6° 673 6° 305 9° 000	+	143	Nipania, XIII Husapura, XIV Gijnor	37 35 34 48 22 55	4° 79' 59.37 4° 88' 42.38 5° 00' 95.02	62508 76602 102212	11° 839 14° 508 19° 358	18
131	Gura, XI Ata Parasan Fort	76 48 18 60 48 15	4° 68' 19.36 4° 63' 45.49 4° 52' 23.34	48077 43107 33292	9° 105 8° 104 6° 305	18	144	Nipania, XIII Gijnor Parbatpur	22 21 37 107 6 55	4° 48' 41.84 4° 79' 14.68 4° 88' 42.38	30492 61868 76602	5° 775 11° 717 14° 508	18
132	Gura, XI Atária Orai Temple	54 48 25 49 32 46	4° 60' 29.69 4° 57' 19.77 4° 67' 68.61	40084 37323 47518	7° 592 7° 069 9° 000	18	145	Nipania, XIII Atária Parbatpur	31 54 10 67 38 8	4° 52' 05.42 4° 79' 14.68 4° 76' 35.54	33154 61868 58017	6° 279 11° 717 10° 988	18
133	Atária Ata Orai Temple	93 58 43 46 26 54	4° 74' 17.31 4° 60' 29.69 4° 54' 69.60	55174 40084 35234	10° 450 7° 592 6° 673	+	146	Atária Parbatpur Siahari Mound	23 15 50 30 8 10	4° 21' 24.86 4° 31' 06.77 4° 52' 05.42	16311 20734 33154	3° 089 3° 927 6° 279	+
134	Gura, XI Orai Temple Karnar	47 18 26 120 28 5	4° 50' 28.01 3° 96' 23.30 4° 57' 19.77	31827 9109 37323	6° 028 1° 737 7° 069	18	147	Nipania, XIII Parbatpur Masmaria Fort	32 0 20 43 57 25	4° 52' 89.38 4° 64' 06.63 4° 79' 14.68	33802 44265 61868	6° 402 8° 384 11° 717	18
135	Gura, XI Ata Karnar	55 18 32 109 39 31	4° 46' 34.10 3° 96' 23.30 4° 52' 23.34	29068 9169 33292	5° 505 1° 737 6° 305	18	148	Atária Parbatpur Masmaria Fort	80 48 2 23 40 43	4° 52' 89.38 4° 138' 36.0 4° 52' 05.42	33802 13752 33154	6° 402 2° 605 6° 279	+

* Base deduced by two sides and included angle. † Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles	
149	Ataria Parbatpur Banora Fort	s. 11 59 3 15 56 33	4° 167294 4° 288795 4° 520542	14699 19444 33154	2° 784 3° 683 6° 279	† †	162	Kanwa, XII Gijnor Chaki Fort	s. 31 32 14 63 58 49	4° 446665 4° 681707 4° 726103	27968 48052 53223	5° 297 9° 101 10° 080	18
150	Nipania, XIII Ata Mahewa Building	s. 11 33 16 14 39 40	4° 477866 4° 579482 4° 821364	30052 37974 66277	5° 692 7° 192 12° 552	18	163	Kanwa, XII Gijnor Sahu Building	s. 13 50 39 88 9 51	4° 114622 4° 735489 4° 726103	13020 54386 53223	2° 466 10° 300 10° 080	”
151	Ataria Himilia Urgan Temple	s. 65 29 20 39 30 12	4° 769160 4° 613717 4° 795135	58771 41088 62393	11° 131 7° 782 11° 817	† †	164	Nipania, XIII Kalpi Dubelkhand	s. 14 57 20 159 38 23	4° 664018 4° 226287 4° 793763	46134 10838 62196	8° 737 3° 189 11° 780	”
152	Kanwa, XII Himilia Urgan Temple	s. 80 24 8 51 29 10	4° 769160 4° 668742 4° 647116	58771 46638 44373	11° 131 8° 833 8° 404	18	165	Nipania, XIII Dubelkhand Kalpi, Chaurasi Temple	s. 23 20 9 148 16 55	4° 660428 4° 783372 4° 226287	45754 60726 10838	8° 666 11° 501 3° 189	18
153	Kanwa, XII Gijnor Jalau Temple No. 1	s. 6 7 20 10 23 34	4° 300338 4° 528603 4° 726103	19968 33776 53223	3° 782 6° 397 10° 080	18	166	Nipania, XIII Ata Katri Temple	s. 84 25 12 30 37 5	4° 862160 4° 571207 4° 821364	72805 37257 66277	13° 789 7° 056 12° 552	18
154	Gijnor Parbatpur Jalau Temple No. 1	s. 69 4 44 38 36 13	4° 475583 4° 300338 4° 484184	29894 19968 30492	5° 662 3° 782 5° 775	” †	167	Nipania, XIII Dubelkhand Pichora Building	s. 34 34 17 99 15 40	4° 122045 4° 362432 4° 226287	13245 23037 10838	2° 508 4° 363 3° 189	” †
155	Kanwa, XII Gijnor Jalau Palace	s. 5 38 54 9 51 43	4° 292018 4° 532617 4° 726103	19589 34089 53223	3° 710 6° 456 10° 080	18	168	Nipania, XIII Dubelkhand Pal House	s. 75 4 21 31 39 40	4° 230169 3° 965150 4° 226287	16989 9220 10838	3° 218 1° 748 3° 189	18
156	Ataria Parbatpur Degaon Fort	s. 18 24 0 63 0 0	4° 024657 4° 475334 4° 520542	10584 29877 33154	2° 005 5° 658 6° 279	† †	169	Gijnor Parbatpur Gurgaon Fort	s. 56 9 13 36 54 0	4° 404158 4° 263256 4° 484184	25360 18334 30492	4° 803 3° 472 5° 775	18
157	Ataria Parbatpur Churki Fort	s. 61 44 5 45 19 15	4° 484935 4° 391978 4° 520542	30545 24659 33154	5° 785 4° 670 6° 279	† †	170	Ataria Parbatpur Samaru Fort	s. 74 1 55 69 48 20	4° 732544 4° 722080 4° 520542	54019 52733 33154	10° 231 9° 987 6° 279	† †
158	Ataria Parbatpur Babai Fort	s. 28 14 50 84 47 0	4° 231730 4° 554812 4° 520542	17050 35877 33154	3° 229 6° 795 6° 279	† †	171	Kanwa, XII Parbatpur Sarawan Fort	s. 58 58 4 66 44 14	4° 773835 4° 804092 4° 750490	59407 63693 56298	11° 251 12° 063 10° 662	18
159	Ataria Parbatpur Charsoni Fort	s. 20 8 25 110 11 10	4° 175338 4° 610846 4° 520542	14974 40817 33154	2° 836 7° 731 6° 279	† †	172	Kanwa, XII Gijnor Sarawan Fort	s. 26 47 36 97 12 30	4° 461496 4° 804092 4° 726103	28940 63693 53223	5° 481 12° 063 10° 080	18
160	Ataria Parbatpur Sarsai Fort	s. 42 50 15 73 56 30	4° 402271 4° 552527 4° 520542	25251 35688 33154	4° 782 6° 759 6° 279	† †	173	Nipania, XIII Gijnor Tarsor Fort	s. 24 10 10 46 39 10	4° 521220 4° 770692 4° 884238	33206 58978 76602	6° 289 11° 170 14° 508	”
161	Kanwa, XII Gijnor Orekhi Fort	s. 21 9 31 48 18 3	4° 312079 4° 627747 4° 726103	20515 42437 53223	3° 885 8° 037 10° 080	18	174	Husapura, XIV Gijnor Tarsor Fort	s. 31 24 15 47 22 21	4° 521220 4° 671066 4° 795937	33206 46888 62508	6° 289 8° 880 11° 839	”

* Base deduced by two sides and included angle. † Instrument not known.

SECONDARY TRIANGULATION. TRIANGLES.

19 K.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
175	Kanwa, XII Gijnor Kaitwa Fort	s. 10 20 58 151 23 30	4° 48' 45.38 4° 49' 10.30 4° 49' 26.103	30518 81339 53223	5° 780 15° 405 10° 080	188	Sikandra Deokali Temple Bhadek	s. 25 13 2 88 12 9	4° 33' 01.89 4° 46' 33.89 4° 47' 00.513	21389 46067 50178	4° 051 8° 725 9° 503	Inch +
176	Nipania, XIII Husapura, XIV Kuthaund Temple	11 26 45 28 34 7	4° 49' 37.37 4° 48' 59.24 5° 00' 55.02	31545 76019 102212	5° 975 14° 398 19° 358	189	Sikandra Bhadek Pinarthu Temple	s. 61 36 35 22 10 0	4° 61' 03.05 4° 24' 26.45 4° 46' 33.89	40767 17484 46067	7° 721 3° 311 8° 725	+
177	Nipania, XIII Husapura, XIV Kuthaund Fort	12 9 36 30 48 52	4° 49' 42.2 4° 48' 54.16 5° 00' 55.02	31584 76810 102212	5° 982 14° 547 19° 358	190	Gandasapur, XV Auraiya Baradana Fort	s. 74 51 57 34 50 55	4° 47' 58.34 4° 24' 81.12 4° 46' 49.32	29911 17706 29170	5° 665 3° 353 5° 525	18 +
178	Nipania, XIII Gandasapur, XV Sikandra	12 40 19 16 27 31	4° 61' 15.76 4° 72' 26.83 4° 95' 77.54	40886 52806 90731	7° 744 10° 001 17° 184	191	Husapura, XIV Atsu, XVI Bareh Temple	s. 32 50 38 37 47 35	4° 67' 91.80 4° 73' 22.26 4° 91' 06.12	47773 53979 83102	9° 048 10° 223 15° 739	18 "
179	Nipania, XIII Sikandra Jatoli Tower	82 16 22 44 13 11	4° 81' 35.01 4° 66' 09.32 4° 72' 26.83	65088 45809 52806	12° 327 8° 676 10° 001	192	Husapura, XIV Bareh Temple Yani	s. 38 59 19 98 13 41	4° 53' 54.85 4° 56' 87.35 4° 73' 22.26	34315 37045 53979	6° 499 7° 016 10° 223	+
180	Nipania, XIII Parbatpur Jatoli Tower	52 54 59 46 51 34	4° 69' 09.1 4° 66' 09.32 4° 79' 14.68	50083 45809 61868	9° 485 8° 676 11° 717	193	Atsu, XVI Bareh Temple Yani	s. 42 41 29 70 43 44	4° 53' 54.85 4° 66' 88.83 4° 67' 91.80	34315 46439 47773	6° 499 8° 795 9° 048	18 +
181	Nipania, XIII Sikandra Jakha Fort	72 50 42 50 15 40	4° 77' 08.31 4° 68' 55.22 4° 72' 26.83	60235 48476 52806	11° 408 9° 181 10° 001	194	Husapura, XIV Yani Jagamanpur Fort	s. 79 4 2 50 19 40	4° 67' 27.20 4° 56' 70.01 4° 56' 87.35	47067 36898 37045	8° 914 6° 988 7° 016	18 +
182	Nipania, XIII Sikandra Chhāni Fort	72 20 2 54 11 40	4° 79' 06.84 4° 72' 26.88 4° 72' 26.83	62016 53295 52806	11° 859 10° 094 10° 001	195	Husapura, XIV Yani Bason Fort	s. 16 51 11 100 0 35	4° 08' 06.01 4° 61' 16.64 4° 56' 87.35	12039 40894 37045	2° 280 7° 745 7° 016	18 +
183	Nipania, XIII Sikandra Kasboro Fort	24 32 59 39 0 15	4° 38' 09.42 4° 56' 06.00 4° 72' 26.83	24504 37119 52806	4° 641 7° 030 10° 001	196	Husapura, XIV Yani Tiar Fort	s. 11 43 52 105 29 30	3° 92' 78.97 4° 60' 30.47 4° 56' 87.35	8470 40146 37045	1° 604 7° 603 7° 016	18 +
184	Nipania, XIII Sikandra Rasdhān Fort	10 49 27 95 16 5	4° 01' 37.28 4° 73' 82.04 4° 72' 26.83	10321 54727 52806	1° 955 10° 365 10° 001	197	Husapura, XIV Yani Nabada Fort	s. 6 24 37 143 46 30	3° 92' 00.55 4° 64' 37.63 4° 56' 87.35	8319 44031 37045	1° 576 8° 339 7° 016	18 +
185	Gandasapur, XV Sikandra Auraiya	98 23 53 49 0 57	4° 72' 09.10 4° 46' 49.32 4° 61' 15.76	53581 29170 40886	10° 148 5° 525 7° 744	198	Husapura, XIV Yani Bareh Fort	s. 38 10 48 100 26 30	4° 53' 59.8 4° 74' 12.63 4° 56' 87.35	34642 55114 37045	6° 561 10° 438 7° 016	18 +
186	Sikandra Auraiya Deokali Temple	14 26 17 68 15 53	4° 12' 32.22 4° 70' 05.13 4° 72' 26.83	13469 50178 53581	2° 551 9° 503 10° 148	199	Atsu, XVI Seontara, XVII Seed	s. 25 3 50 47 25 20	4° 58' 22.11 4° 83' 31.15 4° 95' 06.12	39647 68915 89251	7° 509 13° 052 16° 904	18 "
187	Sikandra Auraiya Bhadek	39 39 19 58 21 37 81 59 4	4° 53' 82.08 4° 66' 33.89 4° 72' 26.83	34531 46067 53581	6° 540 8° 725 10° 148	200	Gandasapur, XV Atsu, XVI Seed	s. 48 48 28 31 7 21	4° 83' 31.15 4° 67' 51.87 4° 95' 06.12	68915 47336 90170	13° 052 8° 965 17° 078	" "

† Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
201	Gandaspur, XV Seed Kakoto Temple	66 39 1 25 37 29	4.638421 4.311490 4.675187	43493 20488 47336	8.237 3.880 8.965	214	Birona, XVIII Guári Gasáro Fort	25 36 4 91 24 31	4.329693 4.693975 4.643949	21365 49428 44050	4.046 9.361 8.343	18 +
202	Gandaspur, XV Auraiya Kakoto Temple	15 47 59 30 32 12	4.040558 4.311490 4.464932	10979 20488 29170	2.079 3.880 5.525	215	Atsu, XVI Guári Gasáro Fort	20 37 50 49 47 18	4.329693 4.665033 4.756858	21365 40306 57129	4.046 8.770 10.820	18
203	Gandaspur, XV Seed Parin Fort Mark (lamp)	61 21 38 47 34 5	4.642654 4.567434 4.675187	43919 36935 47336	8.318 6.995 8.965	216	Seontára, XVII Bidhuna Lakna Fort	24 14 1 13 8 6	4.455528 4.198756 4.625405	28545 15804 42209	5.406 2.993 7.994	" +
204	Atsu, XVI Seontára, XVII Phaphund Building	23 35 44 14 30 13	4.762671 4.559015 4.930612	57899 36226 89251	10.066 6.861 16.904	217	Seed Guári Sahár Fort	55 7 19 52 28 12	4.777967 4.763248 4.843155	59974 57976 60688	11.359 10.980 13.198	+
205	Seontára, XVII Seed Nandu Saháil Fort	59 4 7 33 36 15	4.532061 4.341764 4.598211	34046 21967 39647	6.448 4.160 7.509	218	Bidhuna Guári Sahár Fort	111 37 53 27 5 23	4.777967 4.468061 4.629045	59974 29381 42564	11.359 5.505 8.061	+
206	Seontára, XVII Seed Ponti Fort	79 24 35 16 33 45	4.593113 4.055512 4.598211	39184 11364 39647	7.421 2.152 7.509	219	Birona, XVIII Guári Ruru (Bara) Fort	23 18 33 86 13 51	4.267068 4.668770 4.643949	18496 46641 44050	3.503 8.834 8.343	18 +
207	Birona, XVIII Kalsán, XIX Bidhuna	41 45 58 30 46 41	4.833121 4.718615 4.989112	68096 52314 97524	12.897 9.908 18.470	220	Birona, XVIII Guári Ruru (Chhota) Old Fort	16 24 9 55 58 52	4.115648 4.583286 4.643949	13051 38308 44050	2.472 7.255 8.343	18 +
208	Seontára, XVII Kalsán, XIX Bidhuna	45 8 49 26 4 1	4.833121 4.625405 4.938750	68096 42209 90939	12.897 7.994 17.223	221	Birona, XVIII Guári Kudarkot Temple	14 36 58 8 52 22	4.445432 4.231643 4.643949	27889 17047 44050	5.282 3.229 8.343	18 +
209	Seed Bidhuna Guári	66 24 14 79 33 35	4.629045 4.843155 4.873825	42564 69688 74787	8.061 13.108 14.164	222	Bidhuna Guári Sumáin Fort	64 10 43 48 4 46	4.616993 4.534290 4.629045	41399 34221 42564	7.841 6.481 8.061	+
210	Birona, XVIII Bidhuna Guári	51 33 29 54 9 11 74 17 20	4.629045 4.643949 4.718615	42564 44050 52314	8.061 8.343 9.908	223	Birona, XVIII Guári Sumáin Fort	69 18 15 26 12 34	4.616993 4.291045 4.643949	41399 19545 44050	7.841 3.702 8.343	18 +
211	Atsu, XVI Guári Barsun	55 54 45 28 47 48 95 17 27	4.676839 4.441492 4.756858	47516 27037 57129	8.999 5.234 10.820	224	Birona, XVIII Bidhuna Sabhad Fort	23 24 28 82 10 20	4.334174 4.731123 4.718615	21586 53842 52314	4.088 10.197 9.908	18 +
212	Atsu, XVI Guári Chachhund Fort	8 56 36 17 56 28	4.293147 4.590141 4.756858	19640 38917 57129	3.720 7.371 10.820	225	Kalsán, XIX Bidhuna Sabhad Fort	10 42 39 25 11 1	4.334174 4.693926 4.833121	21586 49423 68096	4.088 9.360 12.897	18 "
213	Seontára, XVII Bidhuna Harehandpur Fort	59 37 19 33 50 4	4.562060 4.371892 4.625405	36480 23545 42209	6.909 4.459 7.994	226	Birona, XVIII Guári Barhind Fort	88 3 57 42 16 1	4.761577 4.589572 4.643949	57753 38866 44050	10.938 7.361 8.343	18 +

* Base deduced by two sides and included angle. † Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
227	Birona, XVIII Bidhuna Barhind Fort	S. 36 30 28 47 39 15	4° 49' 53.40 4° 58' 57.72 4° 7' 18.615	31285 38866 52314	5° 9.25 7° 3.01 9° 9.08	18 †	Seontára, XVII Akupu Dabkari Temple	S. 10 11 50 25 15 39	4° 12' 08.74 4° 50' 29.73 4° 6' 36.318	13209 31840 43283	2° 5.02 6° 0.30 8° 1.98	Inch 18 †
228	Birona, XVIII Bidhuna Airo	S. 34 28 26 69 19 47	4° 48' 41.82 4° 70' 24.45 4° 7' 18.615	30492 50402 52314	5° 7.75 9° 5.46 9° 9.08	18 †	Seontára, XVII Bidhuna Dabkari Temple	S. 108 19 47 30 3 39	4° 78' 05.91 4° 50' 29.73 4° 62' 54.05	60338 31840 42209	11° 4.28 6° 0.30 7° 9.94	18 †
229	Kalsán, XIX Bidhuna Airo	S. 23 6 44 118 45 42	4° 48' 41.82 4° 68' 08.68 4° 83' 31.21	30492 47959 68090	5° 7.75 9° 0.83 12° 8.97	18 †	Seontára, XVII Bidhuna Aneso Fort	S. 77 55 13 35 32 56	4° 65' 31.82 4° 42' 73.79 4° 62' 54.05	44997 26753 42209	8° 5.22 5° 0.67 7° 9.94	18 †
230	Bidhuna Airo Jaraun Fort	S. 48 53 48 82 5 27	4° 48' 34.17 4° 60' 21.09 4° 48' 41.82	30438 40010 30492	5° 7.65 7° 5.78 5° 7.75	† †	Seontára, XVII Akupu Aneso Fort	S. 20 12 44 26 57 14	4° 30' 94.66 4° 42' 73.79 4° 6' 36.318	20392 26753 43283	3° 8.62 5° 0.67 8° 1.98	18 †
231	Kalsán, XIX Airo Jaraun Fort	S. 37 40 13 36 40 15	4° 48' 34.17 4° 47' 34.25 4° 68' 08.68	30438 29746 47959	5° 7.65 5° 6.34 9° 0.83	18 †	Kalsán, XIX Kúrsi Malhausi	S. 27 25 46 75 53 44	4° 43' 69.98 4° 76' 03.27 4° 76' 17.69	27353 57587 57779	5° 1.80 10° 9.07 10° 9.43	18 †
232	Bidhuna Airo Haseran Fort	S. 24 18 36 124 19 31	4° 38' 23.27 4° 68' 46.75 4° 48' 41.82	24117 48381 30492	4° 5.68 9° 1.63 5° 7.75	† †	Akupu Kúrsi Malhausi	S. 26 17 52 17 9 55 136 32 13	4° 43' 69.98 4° 26' 05.71 4° 62' 80.76	27353 18221 42469	5° 1.80 3° 4.51 8° 0.43	† † †
233	Kalsán, XIX Bidhuna Haseran Fort	S. 28 41 13 13 48 58	4° 68' 46.75 4° 38' 14.59 4° 83' 31.21	48381 24069 68096	9° 1.63 4° 5.59 12° 8.97	18	Akupu Malhausi Orolaki Fort	S. 84 34 28 30 42 0	4° 30' 23.21 4° 01' 23.04 4° 26' 05.71	20060 10287 18221	3° 7.99 1° 9.48 3° 4.51	† † †
234	Seontára, XVII Kalsán, XIX Akupu	S. 52 59 8 28 2 35 98 58 17	4° 86' 66.61 4° 63' 63.18 4° 95' 87.50	73513 43283 90939	13° 9.23 8° 1.98 17° 2.23	" †	Seontára, XVII Kalsán, XIX Bela Fort Mark	S. 23 56 49 25 29 47	4° 68' 64.80 4° 71' 19.98 4° 95' 87.50	48583 51523 90939	9° 2.01 9° 7.58 17° 2.23	18 "
235	Seontára, XVII Akupu Khánpur Fort	S. 19 37 49 123 45 47	4° 38' 71.14 4° 78' 06.20 4° 63' 63.18	24384 60342 43283	4° 6.18 11° 4.28 8° 1.98	18 †	Seontára, XVII Akupu Bela Fort Mark	S. 29 2 19 94 1 55	4° 39' 91.73 4° 71' 19.98 4° 63' 63.18	25071 51523 43283	4° 7.48 9° 7.58 8° 1.98	" †
236	Seontára, XVII Kalsán, XIX Khánpur Fort	S. 33 21 19 39 17 57	4° 71' 19.90 4° 78' 06.20 4° 95' 87.50	52383 60342 90939	9° 9.21 11° 4.28 17° 2.23	18 "	Kalsán, XIX Akupu Sirsai Fort	S. 20 15 38 51 11 34	4° 42' 89.63 4° 78' 12.05 4° 86' 63.61	26851 60423 73513	5° 0.85 11° 4.44 13° 9.23	18 †
237	Kalsán, XIX Akupu Kúrsi	S. 35 13 56 51 42 25 93 3 39	4° 62' 80.76 4° 76' 17.69 4° 86' 63.61	42469 57779 73513	8° 0.43 10° 9.43 13° 9.23	" † †	Kalsán, XIX Airo Sirsai Fort	S. 53 25 36 54 50 17	4° 60' 80.86 4° 61' 58.21 4° 68' 08.68	40559 41288 47959	7° 6.82 7° 8.20 9° 0.83	18 †
238	Kalsán, XIX Khánpur Fort Kúrsi	S. 46 29 18 60 15 0	4° 64' 10.49 4° 76' 17.69 4° 71' 19.90	43757 57779 52383	8° 2.87 10° 9.43 9° 9.21	18 †	Kalsán, XIX Kúrsi Sirsai Fort	S. 11 26 12 25 18 38	4° 28' 21.49 4° 61' 58.21 4° 76' 17.69	19149 41288 57779	3° 6.27 7° 8.20 10° 9.43	18 †
239	Seontára, XVII Akupu Jiwa Sirsaini Fort	S. 12 12 11 6 55 45	4° 44' 58.34 4° 20' 22.75 4° 63' 63.18	27915 15932 43283	5° 2.87 3° 0.17 8° 1.98	18 †	Kúrsi Malhausi Bhadaura Fort	S. 36 49 35 82 41 20	4° 27' 50.78 4° 49' 38.22 4° 43' 69.98	18840 31176 27353	3° 5.68 5° 9.05 5° 1.80	† †

† Instrument not known.

RANGIR MERIDIONAL SERIES.

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles	
253	Kalsán, XIX Kúrsi Abath Mound	S. 50 59 58 46 12 58	4 655721 4 623732 4 761769	45261 42047 57779	8 572 7 963 10 943	Inch † †	266	Akupu Benora Aman Fort	27 32 12 63 52 55	4 391652 4 679936 4 726580	24641 47836 53282	4 667 9 064 10 091	Inch † †
254	Akupu Kúrsi Abath Mound	S. 70 46 42 46 50 41	4 635721 4 543661 4 628076	45261 34967 42469	8 572 6 623 8 043	† † †	267	Akupu Benora Jankath Fort	29 26 20 88 36 15	4 472338 4 780600 4 726580	29671 60352 53282	5 620 11 430 10 091	† † †
255	Akupu Kúrsi Galli Fort	S. 34 1 0 72 23 49	4 593894 4 653318 4 628076	24768 42201 42469	4 691 7 993 8 043	† † †	268	Akupu Benora Khairnagar Fort	11 9 12 74 25 38	4 014409 4 711630 4 726580	10337 51479 53282	1 958 9 750 10 091	† † †
256	Kalsán, XIX Akupu Galli Fort	S. 21 3 25 17 41 25	4 625318 4 532556 4 866361	42201 35691 73513	7 993 6 760 13 923	18 † †	269	Akupu Benora Sukhi Fort	10 33 7 40 33 3	4 098200 4 648443 4 726580	12537 44508 53282	2 374 8 430 10 091	† † †
257	Kúrsi Malhausi Mau Building	S. 61 2 38 69 45 30	4 499923 4 530234 4 436998	31617 33903 27353	5 988 6 421 5 180	† † †	270	Akupu Benora Khairnagar Temple	11 35 52 104 52 38	4 077977 4 759886 4 726580	11967 57529 53282	2 266 10 896 10 091	† † †
258	Kalsán, XIX Akupu Indargarh Fort	S. 33 47 40 7 47 59	4 789534 4 176906 4 866361	61593 15028 73513	11 665 2 846 13 923	18 † †	271	Akupu Benora Majelo Fort	33 8 19 75 54 23	4 488750 4 737754 4 726580	30814 54671 53282	5 836 10 354 10 091	18 † †
259	Kalsán, XIX Bela Fort Mark Benora	S. 48 57 33 65 18 19	4 605644 4 687965 4 686480	40331 48749 48583	7 639 9 233 9 201	18 † †	272	Kalsán, XIX Benora Majelo Fort	24 8 21 16 10 30	4 488750 4 322013 4 687965	30814 20990 48749	5 836 3 975 9 233	18 † †
260	Kalsán, XIX Akupu Benora	S. 46 24 45 41 30 22	4 726580 4 687965 4 866361	53282 48749 73513	10 091 9 233 13 923	18 † †	273	Kalsán, XIX Bisungarh, XX Rauli	44 20 26 39 58 57	4 820283 4 783764 4 973719	66112 60780 94128	12 531 11 511 17 827	18 " "
261	Akupu Benora Naili Fort	S. 53 35 48 50 8 22	4 644902 4 624321 4 726580	44147 42104 53282	8 361 7 974 10 091	† † †	274	Bisungarh, XX Chandanpur, XXI Rauli	25 55 39 45 7 57	4 610509 4 820283 4 945622	40786 66112 88231	7 725 12 521 16 710	" " "
262	Akupu Benora Auser Fort	S. 35 40 27 34 50 5	4 518008 4 599006 4 726580	32962 32285 53282	6 243 6 115 10 091	† † †	275	Kalsán, XIX Benora Amolar	79 57 44 38 32 5 61 30 11	4 737355 4 538534 4 687965	54620 34557 48749	10 345 6 545 9 233	" † †
263	Akupu Kúrsi Auser Fort	S. 128 53 14 21 49 45	4 829842 4 599006 4 628076	67584 32285 42469	12 800 6 115 8 043	† † †	276	Kalsán, XIX Rauli Amolar	45 5 38 100 58 42	4 641981 4 538534 4 783764	43851 34557 60780	8 305 6 545 11 511	18 † †
264	Kalsán, XIX Benora Bhadora Temple	S. 38 1 16 68 2 39	4 494812 4 672567 4 687965	31247 47051 48749	5 918 8 911 9 233	18 † †	277	Benora Amolar Tirwa Palace	33 21 57 22 41 52	4 558805 4 404897 4 737355	36208 25404 54620	6 858 4 811 10 345	† † †
265	Akupu Benora Bhadora Temple	S. 27 15 13 24 2 14	4 494812 4 444450 4 726580	31247 27826 53282	5 918 5 270 10 091	† † †	278	Kalsán, XIX Akupu Tirwa Temple	76 53 15 38 27 13	4 898827 4 704008 4 866361	79219 50585 73513	15 004 9 580 13 923	18 † †

† Instrument not known.

SECONDARY TRIANGULATION. TRIANGLES.

23 K

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle used	Station	Corrected Plane Angle	Distance			No. of Triangle used	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles				Log. feet	Feet	Miles	
279	Kalsán, XIX Amolar Tirwa Temple	s. 49 29 14 87 28 24	4.583393 4.704008 4.538534	38494 59583 34557	7.291 9.580 6.545	18 +	Sámán Ber Etáwah Fort (lamp)	s. 32 21 2 106 1 47	4.795922 5.050266 4.889777	62506 112271 77585	11.838 21.263 14.094	18 +	Sámán Ber Etáwah Fort (lamp)	s. 32 21 2 106 1 47	4.795922 5.050266 4.889777	62506 112271 77585	11.838 21.263 14.094	Inch
280	Kalsán, XIX Bisungarh, XX Rausen Fort (lamp)	7 8 1 13 25 34 7 8 1	4.794031 4.522249 4.973719	62234 33285 94128	11.787 6.304 17.827	18 "	Sámán Kuita Etáwah Fort (lamp)	s. 65 11 14 95 38 9	5.010305 5.050266 4.568888	102401 112271 37059	19.394 21.263 7.019	18 +	Sámán Kuita Etáwah Fort (lamp)	s. 65 11 14 95 38 9	5.010305 5.050266 4.568888	102401 112271 37059	19.394 21.263 7.019	+
281	Kalsán, XIX Airo Rausen Fort (lamp)	53 32 33 43 31 53	4.589603 4.522249 4.680868	38869 33285 47959	7.362 6.304 9.083	18 +	Birona, XVIII Kuita Sarhau Fort	s. 58 24 57 27 55 51	4.619685 4.359933 4.688428	41657 22905 48801	7.890 4.338 9.243	18 +	Birona, XVIII Kuita Sarhau Fort	s. 58 24 57 27 55 51	4.619685 4.359933 4.688428	41657 22905 48801	7.890 4.338 9.243	18
282	Bisungarh, XX Rauli Kasáre Building (lamp)	19 58 44 31 54 26	4.458038 4.647509 4.820283	28710 44413 66112	5.438 8.412 12.521	18 "	Birona, XVIII Dorona Sarhau Fort	s. 94 34 5 31 32 25	4.639969 4.359933 4.548710	43648 22905 35376	8.267 4.338 6.700	18 +	Birona, XVIII Dorona Sarhau Fort	s. 94 34 5 31 32 25	4.639969 4.359933 4.548710	43648 22905 35376	8.267 4.338 6.700	18
283	Bisungarh, XX Chandampur, XXI Kasáre Fort	45 54 23 28 53 41	4.817333 4.645213 4.945622	65665 44179 88231	12.437 8.367 16.710	18 "	Dorona Kuita Manan Fort	s. 50 5 14 75 11 14	4.436348 4.536862 4.463441	27312 34424 29070	5.173 6.520 5.506	18 +	Dorona Kuita Manan Fort	s. 50 5 14 75 11 14	4.436348 4.536862 4.463441	27312 34424 29070	5.173 6.520 5.506	18
284	Birona, XVIII Bisungarh, XX Sámán	51 13 28 57 59 27 70 47 5	4.803854 4.930356 4.977084	78317 85184 94860	14.833 16.133 17.965	18 +	Birona, XVIII Dorona Manan Fort	s. 64 18 4 47 52 41	4.536862 4.452335 4.548710	34424 28336 35376	6.520 5.367 6.700	18 +	Birona, XVIII Dorona Manan Fort	s. 64 18 4 47 52 41	4.536862 4.452335 4.548710	34424 28336 35376	6.520 5.367 6.700	18
285	Birona, XVIII Sámán Sakráwa	58 48 42 84 48 16	4.864349 4.705340 4.930356	73173 50739 85184	13.838 9.610 16.133	18 +	Birona, XVIII Dorona Táka Fort	s. 44 36 15 25 49 36	4.421014 4.213688 4.548710	26364 16356 35376	4.993 3.098 6.700	18 +	Birona, XVIII Dorona Táka Fort	s. 44 36 15 25 49 36	4.421014 4.213688 4.548710	26364 16356 35376	4.993 3.098 6.700	18
286	Bisungarh, XX Sámán Sakráwa	66 32 23 34 24 3 79 3 34	4.864349 4.653852 4.893854	73173 45066 78317	13.838 8.535 14.833	18 "	Dorona Kuita Táka Fort	s. 72 8 19 50 5 50	4.514689 4.421014 4.463441	32711 26364 29070	6.195 4.993 5.506	18 +	Dorona Kuita Táka Fort	s. 72 8 19 50 5 50	4.514689 4.421014 4.463441	32711 26364 29070	6.195 4.993 5.506	18
287	Birona, XVIII Sakráwa Dorona	28 55 23 40 51 57 110 12 40	4.417458 4.548710 4.705340	26149 35376 50739	4.952 6.700 9.610	18 +	Dorona Kuita Agani Fort	s. 35 24 30 63 12 52	4.231356 4.419083 4.463441	17036 26247 29070	3.226 4.971 5.506	18 +	Dorona Kuita Agani Fort	s. 35 24 30 63 12 52	4.231356 4.419083 4.463441	17036 26247 29070	3.226 4.971 5.506	18
288	Sámán Sakráwa Dorona	18 27 49 43 56 19 117 35 52	4.417458 4.758095 4.864349	26149 57292 73173	4.952 10.851 13.838	18 +	Dorona Kuita Punja Fort	s. 20 38 53 136 3 35	4.413696 4.707683 4.463441	25924 51013 29070	4.910 9.662 5.506	18 +	Dorona Kuita Punja Fort	s. 20 38 53 136 3 35	4.413696 4.707683 4.463441	25924 51013 29070	4.910 9.662 5.506	18
289	Birona, XVIII Dorona Kuita	36 9 8 97 57 55 45 52 57	4.463441 4.688428 4.548710	29070 48801 35376	5.506 9.243 6.700	18 +	Sámán Kuita Munj Building	s. 46 58 53 82 22 40	4.544600 4.676750 4.568888	35043 47506 37059	6.637 8.997 7.019	18 +	Sámán Kuita Munj Building	s. 46 58 53 82 22 40	4.544600 4.676750 4.568888	35043 47506 37059	6.637 8.997 7.019	18
290	Sámán Dorona Kuita	26 10 51 119 35 36	4.463441 4.568888 4.758095	29070 37059 57292	5.506 7.019 10.851	18 +	Birona, XVIII Kuita Díg Fort	s. 15 26 14 72 43 20	4.113831 4.668599 4.688428	12997 46623 48801	2.461 8.830 9.243	18 +	Birona, XVIII Kuita Díg Fort	s. 15 26 14 72 43 20	4.113831 4.668599 4.688428	12997 46623 48801	2.461 8.830 9.243	18
291	Birona, XVIII Sámán Ber	62 21 8 41 5 50	4.889777 4.760222 4.930356	77385 57573 85184	14.694 10.904 16.133	18 +	Birona, XVIII Dorona Kudrail Fort	s. 24 54 45 38 15 3	4.222724 4.389965 4.548710	16700 24545 35376	3.163 4.649 6.700	18 +	Birona, XVIII Dorona Kudrail Fort	s. 24 54 45 38 15 3	4.222724 4.389965 4.548710	16700 24545 35376	3.163 4.649 6.700	18

† Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles				Log. feet	Feet	Miles	
305	Dorona Kuita Kudraal Fort	S. " "	4° 42' 52"	23185	4° 770	318	Sámán Kuita Saumási Fort	S. " "	4° 401144	23185	4° 770	318	Sámán Kuita Saumási Fort	78° 34' 27"	4° 668151	46575	8° 821	Inch
			4° 55' 55"	16700	3° 163				4° 222724	16700	3° 163			50° 10' 25"	4° 562199	36492	6° 911	"
				29070	5° 506				4° 463441	29070	5° 506				4° 568888	37059	7° 019	"
306	Birona, XVIII Dorona Seonthana Fort	S. " "	32° 12' 50"	22020	4° 170	319	Sámán Kuita Kusmara Fort	S. " "	4° 342818	22020	4° 170	319	Sámán Kuita Kusmara Fort	101° 4' 5"	4° 796801	62033	11° 862	"
			88° 52' 10"	41299	7° 822				4° 615940	41299	7° 822			43° 26' 2"	4° 642238	43877	8° 310	"
				35376	6° 700				4° 548710	35376	6° 700				4° 568888	37059	7° 019	"
307	Sámán Kuita Baro Fort	S. " "	42° 51' 55"	26912	5° 097	320	Bisungarh, XX Sámán Gangawára	S. " "	4° 429939	26912	5° 097	320	Bisungarh, XX Sámán Gangawára	54° 48' 49"	4° 814695	65267	12° 361	"
			67° 37' 5"	36580	6° 928				4° 563238	36580	6° 928			46° 27' 54"	4° 762634	57894	10° 965	"
				37059	7° 019				4° 568888	37059	7° 019				4° 893854	78317	14° 833	"
308	Sámán Kuita Parasna Fort	S. " "	87° 42' 53"	51037	9° 666	321	Sámán Gangawára Mainpuri, Court House	S. " "	4° 707885	51037	9° 666	321	Sámán Gangawára Mainpuri, Court House	51° 25' 27"	4° 840411	69249	13° 115	"
			45° 46' 17"	36600	6° 932				4° 563484	36600	6° 932			81° 6' 48"	4° 942080	87514	16° 575	"
				37059	7° 019				4° 568888	37059	7° 019				4° 814695	65267	12° 361	"
309	Dorona Kuita Laigaon Fort	S. " "	62° 25' 57"	25776	4° 882	322	Bisungarh, XX Pothári, XXIII Barkhera	S. " "	4° 411213	25776	4° 882	322	Bisungarh, XX Pothári, XXIII Barkhera	34° 28' 32"	4° 760250	57577	10° 905	18
			26° 16' 43"	12873	2° 438				4° 109696	12873	2° 438			52° 47' 14"	4° 908521	81007	15° 342	"
				29070	5° 506				4° 463441	29070	5° 506				5° 006896	101601	19° 243	"
310	Dorona Kuita Basait Fort	S. " "	34° 11' 22"	16480	3° 121	323	Bisungarh, XX Chandanpur, XXI Barkhera	S. " "	4° 216964	16480	3° 121	323	Bisungarh, XX Chandanpur, XXI Barkhera	26° 10' 3"	4° 599531	38952	7° 377	"
			63° 25' 8"	26228	4° 967				4° 418765	26228	4° 967			66° 30' 30"	4° 908521	81007	15° 342	"
				29070	5° 506				4° 463441	29070	5° 506				4° 945622	88231	16° 710	"
311	Sámán Kuita Bina Building	S. " "	67° 10' 3"	34979	6° 625	324	Chandanpur, XXI Barkhera Chhibramau Thána	S. " "	4° 543803	34979	6° 625	324	Chandanpur, XXI Barkhera Chhibramau Thána	66° 30' 30"	4° 743355	55380	10° 489	"
			35° 17' 35"	21927	4° 153				4° 340987	21927	4° 153			73° 19' 17"	4° 762264	57845	10° 955	"
				37059	7° 019				4° 568888	37059	7° 019				4° 590531	38952	7° 377	"
312	Sámán Kuita Mangawan Building	S. " "	92° 25' 25"	45933	8° 699	325	Bisungarh, XX Barkhera Chhibramau Thána	S. " "	4° 662126	45933	8° 699	325	Bisungarh, XX Barkhera Chhibramau Thána	26° 10' 3"	4° 743355	55380	10° 489	"
			33° 51' 45"	25617	4° 852				4° 408527	25617	4° 852			14° 0' 10"	4° 482679	30386	5° 755	"
				37059	7° 019				4° 568888	37059	7° 019				4° 908521	81007	15° 342	"
313	Sámán Kuita Pharenji Fort	S. " "	20° 8' 15"	22394	4° 241	326	Chandanpur, XXI Pothári, XXIII Maudo	S. " "	4° 350127	22394	4° 241	326	Chandanpur, XXI Pothári, XXIII Maudo	17° 47' 19"	4° 624313	42103	7° 974	"
			14° 35' 37"	16389	3° 104				4° 214557	16389	3° 104			26° 40' 22"	4° 791438	61864	11° 717	"
				37059	7° 019				4° 568888	37059	7° 019				4° 984657	96529	18° 282	"
314	Dorona Kuita Shamsheganj Fort	S. " "	81° 4' 12"	33367	6° 320	327	Bisungarh, XX Chandanpur, XXI Maudo	S. " "	4° 523321	33367	6° 320	327	Bisungarh, XX Chandanpur, XXI Maudo	44° 25' 58"	4° 701438	61864	11° 717	"
			39° 32' 28"	21503	4° 073				4° 332506	21503	4° 073			48° 45' 24"	4° 822465	66445	12° 584	"
				29070	5° 506				4° 463441	29070	5° 506				4° 945622	88231	16° 710	"
315	Sámán Kuita Kishni Fort	S. " "	56° 29' 47"	31029	5° 877	328	Pothári, XXIII Barkhera Fatehgarh Church	S. " "	4° 491762	31029	5° 877	328	Pothári, XXIII Barkhera Fatehgarh Church	31° 8' 34"	4° 559284	36248	6° 865	"
			58° 41' 42"	23263	4° 406				4° 366675	23263	4° 406			93° 37' 23"	4° 844779	69949	13° 248	"
				37059	7° 019				4° 568888	37059	7° 019				4° 760250	57577	10° 905	"
316	Sámán Kuita Sauj Building	S. " "	124° 0' 45"	47276	8° 954	329	Pothári, XXIII Mau, XXIV Fatehgarh Church	S. " "	4° 674637	47276	8° 954	329	Pothári, XXIII Mau, XXIV Fatehgarh Church	32° 37' 47"	4° 707977	51048	9° 668	"
			15° 27' 47"	13206	2° 880				4° 182015	13206	2° 880			47° 38' 2"	4° 844779	69949	13° 248	"
				37059	7° 019				4° 568888	37059	7° 019				4° 969920	93308	17° 672	"
317	Sámán Kuita Atsara Fort	S. " "	100° 20' 10"	41764	7° 910	330	Pothári, XXIII Barkhera Farrukhabad Temple	S. " "	4° 620801	41764	7° 910	330	Pothári, XXIII Barkhera Farrukhabad Temple	42° 3' 23"	4° 587503	38681	7° 326	"
			18° 51' 45"	13725	2° 599				4° 157510	13725	2° 599			52° 19' 7"	4° 659926	45701	8° 655	"
				37059	7° 019				4° 568888	37059	7° 019				4° 760250	57577	10° 905	"

† Instrument not known.

SECONDARY TRIANGULATION. TRIANGLES.

25—K.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle used	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
331	Pothári, XXIII Man, XXIV Farrukhabad Temple	21 42 58 18 23 38	4.729072 4.659926 4.999920	53588 45701 93308	10.149 8.655 17.672	Inch 18 "	Kasrak, XXVIII Janjiri, XXIX Khera Bajhera	44 8 13 22 14 57 113 36 50	4.857340 4.592717 4.976517	72001 39149 94737	13.637 7.415 17.943	Inch 18 "
332	Pothári, XXIII Barkhera Farrukhabad Palace	41 22 34 61 0 19	4.590671 4.712312 4.760250	38965 51560 57577	7.380 9.765 10.905	" " "	Kasrak, XXVIII Khera Bajhera Sháhábád	31 51 2 95 23 20	4.414134 4.689818 4.592717	25950 48957 39149	4.915 9.272 7.415	18 " "
333	Pothári, XXIII Man, XXIV Farrukhabad Palace	22 23 47 23 17 23	4.696235 4.712312 4.909920	49686 51560 93308	9.410 9.765 17.672	" " "	Kasrak, XXVIII Janjiri, XXIX Dilwári Mound	31 6 13 60 14 34	4.689781 4.915225 4.976517	48953 82267 94737	9.271 15.581 17.943	18 " "
334	Pothári, XXIII Farrukhabad Temple Nawárganj	96 6 41 63 29 45	4.705675 4.250296 4.659926	50778 17795 45701	9.617 3.370 8.655	" " +	Kasrak, XXVIII Gajnera, XXX Faridpur Thána	32 37 56 39 25 42	4.758362 4.829427 5.004932	57327 67519 101142	10.857 12.788 19.156	" " "
335	Pothári, XXIII Man, XXIV Roshanabad House	39 15 33 24 21 39	4.818963 4.633081 4.909920	65912 42962 93308	12.483 8.137 17.672	18 " "	Kasrak, XXVIII Janjiri, XXIX Faridpur Thána	24 56 10 40 20 47	4.643158 4.829427 4.976517	43970 67519 94737	8.328 12.788 17.943	" " "
336	Man, XXIV Guri, XXV Roshanabad House	40 7 33 42 13 53	4.800713 4.818963 4.987636	63199 65912 97193	11.970 12.483 18.408	" " "	Janjiri, XXIX Fatehganj, XXXI Ismailpur House (lamp)	31 41 21 42 19 10	4.759055 4.866823 5.021499	57419 73591 105075	10.875 13.938 19.901	" " "
337	Man, XXIV Guri, XXV Shamsabad	28 28 50 51 27 59	4.672747 4.887698 4.987636	47070 77214 97193	8.915 14.624 18.408	" " "	Fatehganj, XXXI Ismailpur House (lamp) Unchagaon	51 1 47 76 37 31	4.661681 4.669559 4.759055	45886 46756 57419	8.691 8.830 10.875	" " +
338	Man, XXIV Guri, XXV Jalálábád	47 58 28 54 20 31	4.868648 4.907578 4.907636	73901 80831 97193	13.996 15.309 18.408	" " "	Janjiri, XXIX Ismailpur House (lamp) Unchagaon	38 32 28 87 48 45	4.661681 4.773138 4.866823	45886 59311 73591	8.691 11.233 13.938	18 " +
339	Man, XXIV Dháká, XXVI Jalálábád	5 38 53 38 44 43	4.104174 4.907578 4.955939	12711 80831 90352	2.407 15.309 17.112	" " +	Janjiri, XXIX Unchagaon Parbata	48 52 38 28 52 18	4.660111 4.466954 4.773138	45721 29306 59311	8.659 5.550 11.233	18 " +
340	Dháká, XXVI Saipur, XXVII Bodona	13 19 19 12 10 16 154 30 25	4.757526 4.718937 5.028875	57217 52352 106875	10.837 9.915 20.241	+	Janjiri, XXIX Fatehganj, XXXI Bareilly Kachahri	23 50 33 23 16 55	4.763115 4.753372 5.021499	57958 56072 105075	10.977 10.733 19.901	18 " "
341	Jalálábád Bodona Ekri House (lamp)	55 33 42 63 3 25	4.716479 4.750264 4.743573	52057 56268 55408	9.859 10.657 10.494	+	Janjiri, XXIX Fatehganj, XXXI Bareilly House	16 16 34 26 16 35	4.638953 4.837493 5.021499	43546 68785 105075	8.247 13.027 19.901	" " "
342	Dháká, XXVI Bodona Bari Matána Mound	43 11 46 62 29 55	4.570811 4.683362 4.718937	37223 48235 52352	7.050 9.135 9.915	+	Janjiri, XXIX Fatehganj, XXXI Aliganj Building	23 18 28 39 49 8	4.668463 4.877556 5.021499	46608 75432 105075	8.827 14.286 19.901	" " "

* Base deduced by two sides and included angle. † Instrument not known.

June 1879.

J. B. N. HENNESSEY,
In charge of Computing Office.

RANGIR MERIDIONAL SERIES.

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL,

PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
AIRO s. Birona, XVIII Rausen Fort (lamp) Haseran Fort Kalsán, XIX Jaraun Fort Siráo Fort Bidhúna s. 338 42 30	228 281 282 229 230 250 228	AKUPU s. Bhadaura Temple Abath Mound Khánpur Fort Sukhi Fort Tirwa Temple Benora Sirsai Fort Khaínagar Fort Khaínagar Temple Oroláki Fort Anan Fort Jankath Fort Auser Fort Naili Fort	265 254 235 269 278 260 249 268 270 246 266 267 262 261	AMOLAR s. Tirwa Palace Benora ÁTA s. Gura, XI Karmar Chamári Orai Temple Banha-Fort Atária Nipania, XIII Mahewa Building Katri Temple Itaura Temple Parásan Fort	277 275 130 135 138 133 139 129 129 150 166 137 131
AKUPU s. Dabkari Temple Seontára, XVII Jiwa Sirsámi Fort Aneso Fort Kúrsi Malhausi Gaili Fort Bela Fort Mark Kalsán, XIX Indargarh Fort Majelo Fort	240 234 239 243 237 245 255 248 234 258 271	AMOLAR s. Kalsán, XIX Rauli Tirwa Temple	275 276 279	ATARA, XI* Fatehgari, XXXI Sigarh, X* Gajnera, XXX	83 84 88

* Of the North-East Longitudinal Series.

Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance
ATARIA s. Muhammadabad Orai Temple Rinia Building Bargaon Building Himilia Garur Mound (lamp) Kanwa, XII Siahari Mound Urgaon Temple Parbatpur Banora Fort Degaon Fort Charsoni Fort Babai Fort Sarsai Fort Churki Fort Samarhu Fort Nipania, XIII Masmaria Fort Ara Gura, XI	117 132 125 123 118 126 113 146 151 145 149 156 159 158 160 157 170 113 148 129 114	BADARWARA h.s. Kotra Temple Gokulphara, X Dhanora Temple Koratha Temple Garwai Fort BADSHAHPTER h.s. Kusmar, I Bila BAKARUA h.s. Tinsmal, VII† Hardua Tree Kusmar, I BAKSUA h.s. Mangrai Building Dalipur, II Baksua Fort Baksua Temple Kusmar, I Semra Fort BANSAPAR h.s. Sanna Chandla, III Chhatarpur Temple Thanela, VI Maniagarh Talgaon Hill Mark Sonha BARKHERA s. Chhibramau Thana Bisungarh, XX Pothari, XXIII Farrukhabad Temple Farrukhabad Palace Fatehgarh Church Chandanpur, XXI BARSAN s. Guari Atsu, XVI BAUKHAR s. Muhammadabad Airo Fort Gura, XI Parasan Temple	107 100 104 108 101 52 52 39 45 39 42 37 40 41 37 38 63 61 61 62 66 65 64 324 322 322 330 332 328 323 211 211 119 121 119 122	BENORA s. Akupu Bhadora Temple Bela Fort Sukhi Fort Majelo Fort Kalsan, XIX Amolar Tirva Palace Khairnagar Temple Jankath Fort Khairnagar Fort Aman Fort Naili Fort Auser Fort BER s. Etawah Fort (lamp) Samán Birona, XVIII BHADEK s. Deokali Temple Auraiya Pinarhu Temple Sikandra BHORAJ, IV Datara, V Sonar Hill Mark Chandla, III Dalipur, II BIA BARARI h.s. Rangr, X† Kusmar, I BIDHUNA s. Guari Birona, XVIII Sumán Fort Barhind Fort Airo Sabhad Fort Haseran Fort Kalsan, XIX Jaraun Fort Aneso Fort Dabkari Temple Sabhar Fort Seontara, XVII	260 264 264 269 259 271 259 275 270 267 268 266 261 262 292 291 291 188 187 189 187 5 75 4 4 43 43 209 207 222 227 228 224 232 207 230 242 241 218 208

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
BIDHUNA s. Lakna Fort Seed Harchandpur Fort	216 209 213	BISUNGARH, XX Rauli Kasave Fort Kasave Building (lamp) Kalsán, XIX Rausen Fort (lamp)	273 288 282 20 280	DALIPUR, II Sháhgarh Fort Tinsmál, VII† Hasri Bamnora Fort Bhoraj, IV Dhasán River Temple Senpa Temple Khatoli Gateway Chandla, III Pola Bila Kusmár, I Baksua Hardua Tree	47 2 46 48 4 58 56 57 3 54 49 2 37 44	BIDHUNA s. Lakna Fort Seed Harchandpur Fort	216 209 213
BILA h.s. Kusmár, I Dálipur, II Senpa Temple Khatoli Gateway Chandla, III Bádsháhpur Gopálpur Gadakhár	50 49 56 57 49 52 53 51	BODONA s. Ekri House (lamp) Saipur, XXVII Bari Matána Mound Dháká, XXVI Jalálabad	341 340 342 340 341	DALIPUR, II Sháhgarh Fort Tinsmál, VII† Hasri Bamnora Fort Bhoraj, IV Dhasán River Temple Senpa Temple Khatoli Gateway Chandla, III Pola Bila Kusmár, I Baksua Hardua Tree	47 2 46 48 4 58 56 57 3 54 49 2 37 44	BILA h.s. Kusmár, I Dálipur, II Senpa Temple Khatoli Gateway Chandla, III Bádsháhpur Gopálpur Gadakhár	50 49 56 57 49 52 53 51
BIRONA, XVIII Atsu, XVI Gasáro Fort Sarhau Fort Ber Manan Fort Dág Fort Táka Fort Kuita Seonthana Fort Sámán Kudráil Fort Dorona Bisungarh, XX Sakráwa Kalsán, XIX Barhind Fort Airo Sabhad Fort Sumáin Fort Bidhúna Seontára, XVII Ruru (Bara) Fort Ruru (Chhoia) Old Fort Kudarkot Temple Guári	18 214 294 291 297 803 298 289 806 284 804 287 20 285 19 226 228 224 223 207 18 219 220 221 210	CHAMARI s. Gura, XI Áta	138 138	DALIPUR, II Sháhgarh Fort Tinsmál, VII† Hasri Bamnora Fort Bhoraj, IV Dhasán River Temple Senpa Temple Khatoli Gateway Chandla, III Pola Bila Kusmár, I Baksua Hardua Tree	47 2 46 48 4 58 56 57 3 54 49 2 37 44	BIRONA, XVIII Atsu, XVI Gasáro Fort Sarhau Fort Ber Manan Fort Dág Fort Táka Fort Kuita Seonthana Fort Sámán Kudráil Fort Dorona Bisungarh, XX Sakráwa Kalsán, XIX Barhind Fort Airo Sabhad Fort Sumáin Fort Bidhúna Seontára, XVII Ruru (Bara) Fort Ruru (Chhoia) Old Fort Kudarkot Temple Guári	18 214 294 291 297 803 298 289 806 284 804 287 20 285 19 226 228 224 223 207 18 219 220 221 210
BISUNGARH, XX Rauli Kasave Fort Kasave Building (lamp) Kalsán, XIX Rausen Fort (lamp)	273 288 282 20 280	BODONA s. Ekri House (lamp) Saipur, XXVII Bari Matána Mound Dháká, XXVI Jalálabad	341 340 342 340 341	DALIPUR, II Sháhgarh Fort Tinsmál, VII† Hasri Bamnora Fort Bhoraj, IV Dhasán River Temple Senpa Temple Khatoli Gateway Chandla, III Pola Bila Kusmár, I Baksua Hardua Tree	47 2 46 48 4 58 56 57 3 54 49 2 37 44	BISUNGARH, XX Rauli Kasave Fort Kasave Building (lamp) Kalsán, XIX Rausen Fort (lamp)	273 288 282 20 280
BODONA s. Ekri House (lamp) Saipur, XXVII Bari Matána Mound Dháká, XXVI Jalálabad	341 340 342 340 341	CHANDANPUR, XXI Kalsán, XIX Rauli Kasave Fort Bisungarh, XX Chhibraman Thána Maudó Muhammadabad, XXII Barkhera Pothári, XXIII Man, XXIV	21 274 283 21 324 326 22 323 23 25	DALIPUR, II Sháhgarh Fort Tinsmál, VII† Hasri Bamnora Fort Bhoraj, IV Dhasán River Temple Senpa Temple Khatoli Gateway Chandla, III Pola Bila Kusmár, I Baksua Hardua Tree	47 2 46 48 4 58 56 57 3 54 49 2 37 44	CHANDANPUR, XXI Kalsán, XIX Rauli Kasave Fort Bisungarh, XX Chhibraman Thána Maudó Muhammadabad, XXII Barkhera Pothári, XXIII Man, XXIV	21 274 283 21 324 326 22 323 23 25
CHANDLA, III Kusmár, I Pola Bila Dálipur, II Dhasán River Temple Bhoraj, IV Gulganj Fort Palera Temple Datárá, V Man Saría Temple Nagroa Chhatarpur Temple Ragauli Fort Thanela, VI Naráyanpur Fort Bijáwar Temple Bijáwar Palace Maniagarh Bánsparh Nánra Gopálpur	3 54 49 3 58 4 73 88 5 87 68 59 74 6 72 70 71 67 61 63 53	CHANDLA, III Kusmár, I Pola Bila Dálipur, II Dhasán River Temple Bhoraj, IV Gulganj Fort Palera Temple Datárá, V Man Saría Temple Nagroa Chhatarpur Temple Ragauli Fort Thanela, VI Naráyanpur Fort Bijáwar Temple Bijáwar Palace Maniagarh Bánsparh Nánra Gopálpur	3 54 49 3 58 4 73 88 5 87 68 59 74 6 72 70 71 67 61 63 53	DALIPUR, II Sháhgarh Fort Tinsmál, VII† Hasri Bamnora Fort Bhoraj, IV Dhasán River Temple Senpa Temple Khatoli Gateway Chandla, III Pola Bila Kusmár, I Baksua Hardua Tree	47 2 46 48 4 58 56 57 3 54 49 2 37 44	CHANDLA, III Kusmár, I Pola Bila Dálipur, II Dhasán River Temple Bhoraj, IV Gulganj Fort Palera Temple Datárá, V Man Saría Temple Nagroa Chhatarpur Temple Ragauli Fort Thanela, VI Naráyanpur Fort Bijáwar Temple Bijáwar Palace Maniagarh Bánsparh Nánra Gopálpur	3 54 49 3 58 4 73 88 5 87 68 59 74 6 72 70 71 67 61 63 53
DORONA s. Táka Fort Sarhau Fort Kudráil Fort Manan Fort Agani Fort Punja Fort Seonthana Fort Kuita Basait Fort Sámán Laigaon Fort Shamsherganj Fort Sakráwa Birona, XVIII	298 295 304 296 300 301 306 289 310 288 309 314 287 287	DORONA s. Táka Fort Sarhau Fort Kudráil Fort Manan Fort Agani Fort Punja Fort Seonthana Fort Kuita Basait Fort Sámán Laigaon Fort Shamsherganj Fort Sakráwa Birona, XVIII	298 295 304 296 300 301 306 289 310 288 309 314 287 287	DALIPUR, II Sháhgarh Fort Tinsmál, VII† Hasri Bamnora Fort Bhoraj, IV Dhasán River Temple Senpa Temple Khatoli Gateway Chandla, III Pola Bila Kusmár, I Baksua Hardua Tree	47 2 46 48 4 58 56 57 3 54 49 2 37 44	DORONA s. Táka Fort Sarhau Fort Kudráil Fort Manan Fort Agani Fort Punja Fort Seonthana Fort Kuita Basait Fort Sámán Laigaon Fort Shamsherganj Fort Sakráwa Birona, XVIII	298 295 304 296 300 301 306 289 310 288 309 314 287 287

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	
DUEKHAND S. Nipania, XIII Pál House Pichora Building Kálpi Kálpi, Chaurási Temple	108 28 41 140 8 21 207 44 21 308 50 18 320 11 46	164 168 167 164 165	GUJNOR S. Jálaun Temple No. 1 Jálaun Palace Kanwa, XII Orekhí Fort Cháki Fort Sahu Building Sarawan Fort Husapura, XIV Kaitwa Fort Tarsor Fort Gurgaon Fort Nipania, XIII Parbatpur	21 1 23 21 33 14 31 24 57 79 43 0 95 23 46 119 34 48 128 37 27 167 23 40 182 48 27 214 46 1 255 47 26 261 25 11 311 56 39	153 155 142 161 162 163 172 143 175 173 169 142 144	GURA, XI Gokulphára, X Airo Fort Muhammadabad Bargaon Building Himilia Orai Temple Garar Mound (lamp) Kanwa, XII Karnar Atária Banha Fort Chamári Nipania, XIII Áta Sandi Fort Kálpi Parásan Temple Parásan Fort Baukhar Phára, IX	50 55 56 05 53 40 32 73 40 47 88 14 53 94 25 36 103 51 40 108 6 40 112 32 55 04 151 10 6 158 40 5 171 50 29 180 32 54 185 31 40 35 206 28 38 215 31 50 224 48 40 281 24 9 283 16 56 339 26 53 339 45 54 23	11 121 117 124 116 132 127 12 134 114 139 138 13 130 136 141 122 131 119 11
FATEHGANJ, XXXI Aliganj Building Ismaelpur House (lamp) Sísarh, X* Atária, XI* Gajnera, XXX Bareilly House Bareilly Kachahri Unchagaon Janjiri, XXIX	23 7 11 25 37 13 180 33 55 60 233 51 49 60 292 53 1 30 317 1 28 320 1 8 334 35 26 343 18 2 59	354 348 34 33 32 353 352 349 32	GOKULPHARA, X Garvai Fort Koratha Temple Sagauli Temple Badarwára Dakoli Temple Perona Fort Kalra Chirauli Fort Sayyidnagar Temple Kanwa, XII Himilia Kotra Temple Gura, XI Phára, IX Revábarti Temple Kacher Hill Mark Dhanora Temple Nágónáth, VIII	42 27 5 49 3 42 66 38 47 81 37 11 107 35 27 125 58 54 140 33 25 159 6 53 161 8 28 177 40 8 83 197 1 57 202 49 1 230 48 46 75 282 0 38 23 324 50 28 332 56 5 351 11 56 352 0 49 11	101 103 102 100 105 112 111 109 108 12 115 107 11 96 99 104 10	GURI, XXV Pothári, XXIII Saipur, XXVII Dháká, XXVI Jálálabad Man, XXIV Roshanabad House Shamsabad	4 9 28 88 174 29 9 01 249 11 32 04 253 54 40 308 15 10 51 350 29 4 359 43 10	26 28 27 338 26 336 337
GANDASPUR, XV Nipania, XIII Husapura, XIV Auraiya Kakoto Temple Parin Fort Mark (lamp) Atsu, XVI Baradána Fort Seod Seontára, XVII Sikandra	1 40 58 11 65 59 41 28 83 37 20 99 25 19 104 42 42 117 15 52 44 158 29 17 166 4 20 178 37 17 16 345 13 27	15 15 185 201 203 16 190 200 17 178	GOPALPUR h.s. Bila Chandla, III GUARI t.s. Atsu, XVI Chachhúnd Fort Barsan Gasáro Fort Birona, XVIII Kudarkot Temple Sumáin Fort Barhind Fort Ruru (Chhota) Old Fort Bídhuna Ruru (Bara) Fort Sahar Fort Seod	128 1 43 177 53 19 19 41 33 37 38 1 48 29 21 69 28 51 160 53 22 169 45 44 187 5 56 203 9 23 216 52 14 235 10 42 247 7 13 262 16 5 314 44 17	53 53 211 212 211 214 210 221 222 226 220 209 219 217 209	HASRI h.s. Bannora Fort Dálipur, II Hardua Tree Sháhgarh Fort HIMILIA s. Gokulphára, X Girthan Fort Dantoli Temple Kanwa, XII Urgaon Temple Kukargaon Building Atária Gura, XI Rinia Building Muhammadabad Bargaon Building HUSAPURA, XIV Kanwa, XII Jagamanpur Fort	165 56 7 214 33 51 307 45 6 359 24 26 17 3 52 29 16 37 133 12 37 140 2 31 191 31 41 200 31 57 231 1 53 274 20 22 284 19 55 297 40 23 306 10 10 7 31 47 13 115 7 10	48 46 46 47 115 120 128 115 151 140 118 116 125 118 123
GANGAWARA S. Sámán Mainpuri, Court House Bisungarh, XX	20 27 24 101 34 12 301 44 7	320 321 320	GARA SANDNA h.s. Mukána Hill Mark Karri Thanela, VI Putli Bakoára Pai Temple	4 39 12 127 6 42 162 8 36 186 32 53 234 37 3	83 81 82 81 84			

* Of the North-East Longitudinal Series.

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HUSAPURA, XIV Bareh Temple Bareh Fort Tiar Fort Atsu, XVI Yani Nabada Fort Bason Fort Gandaspur, XV Kuthaund Fort Kuthaund Temple Nipania, XIII Tarsor Fort Gijnor	155 11 53 156 0 24 182 27 20 188 2 31 20 194 11 12 200 35 49 211 2 23 245 52 11 43 268 10 47 270 25 32 298 59 39 40 315 58 19 s. 347 22 34	191 198 196 16 192 197 195 15 177 176 14 174 143	KALSAN, XIX Sabhad Fort Airo Haseran Fort Birona, XVIII Rausen Fort (lamp) Bisungarh, XX Rauli Chandanpur, XXI Amolar Tirwa Temple Benora Indargarh Fort Majelo Fort Sirsai Fort Abath Mound Khanpur Fort Bhadaura Temple Akupu Bela Fort Mark Malhausi	47 36 11 s. 60 0 16 65 34 45 67 40 13 47 113 32 50 126 58 23 68 s. 171 18 50 181 9 46 62 216 24 28 265 53 42 296 22 12 308 59 17 320 30 33 322 31 19 327 0 55 331 31 35 334 23 28 s. 342 46 57 345 19 45 350 35 7	225 229 233 19 280 20 273 21 275 278 259 258 272 249 253 236 264 234 247 244	KARRI h.s. Ohhatarpur Temple Seyah Tilona Temple Thonela, VI Putli Bakoara Gara Sandna Mukana Hill Mark	79 78 85 78 80 81 83
JALALABAD s. Guri, XXV Ekri House (lamp) Bodona Dhaka, XXVI Man, XXIV	74 0 47 95 33 17 s. 151 6 59 220 43 22 356 19 46	338 341 341 339 338	KANWA, XII Chirauli Fort Badarwara Dakoli Temple Chaki Fort Sarawan Fort Husapura, XIV Oreki Fort Sahu Building Kaitwa Fort Gijnor Jalaun Palace Jalaun Temple No. 1 Urgaon Temple Nipania, XIII Parbatpur Ataria Kukargaon Building Gura, XI Garar Mound (lamp) Himila Dantoli Temple Girthan Fort Gokulphara, X	4 16 39 h.s. 15 27 11 24 59 36 179 50 31 184 35 9 187 30 38 97 190 13 14 197 32 6 201 1 47 s. 211 22 45 217 1 39 217 30 5 239 36 6 241 10 53 21 s. 243 33 13 266 4 44 272 47 53 292 25 21 40 299 19 17 320 0 14 333 23 10 342 23 54 357 39 46 95	110 100 106 162 171 14 161 163 175 142 155 153 152 13 171 113 140 12 126 115 128 120 12	KHERA BAJHERA s. Janjiri, XXIX Kasrak, XXVIII Shahabad	343 343 344
JANJIRI, XXIX Ismailpur House (lamp) Aiganj Building Fateganj, XXXI Unchagaon Bareilly House Bareilly Kachahri Parbata Gajnera, XXX Faridpur Thana Kasrak, XXVIII Khera Bajhera Dilwari Mound Saipur, XXVII	131 39 22 140 2 15 163 20 42 67 s. 170 11 50 179 37 17 187 11 16 219 4 28 233 56 15 54 258 12 50 298 33 36 55 320 48 34 358 48 11 358 48 37 09	348 354 32 350 353 352 351 31 347 30 343 345 30	KURTA s. Dig Fort Punja Fort Etawah Fort (lamp) Munj Building Baro Fort Parasna Fort Bina Building Mangawan Building Sauj Building Samán Pharenji Fort Atsara Fort Kishni Fort Kusmara Fort Samasi Fort Basait Fort Shamsherganj Fort Laigaon Fort Dorona Kudrail Fort Birona, XVIII Taka Fort Agani Fort Sarhan Fort Maman Fort	24 9 46 41 37 4 50 19 44 63 35 13 78 20 48 100 11 36 110 40 18 112 6 8 130 30 6 s. 145 57 53 160 33 30 164 49 38 184 39 35 189 23 55 196 8 18 202 8 21 226 1 1 239 16 46 s. 265 33 29 300 29 24 311 26 26 315 39 19 328 46 21 339 22 17 340 44 43	303 301 293 302 307 308 311 312 316 290 313 317 315 319 318 310 314 309 289 305 289 299 300 294 296		
KALPI s. Gura, XI Nipania, XIII Duhelkhand	44 53 36 123 28 55 s. 128 53 12	141 141 164	KALRA h.s. Badarwara Gokulphara, X	91 37 50 s. 221 30 14 240 41 58 256 12 44 331 9 45	134 135 136 137 134	KALSAN, XIX Gaili Fort Siriao Fort Seontara, XVII Kursi Jaraun Fort Bidhna	256 250 19 237 231 207

Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance
KURSI s. Kalsán, XIX Mau Building Gaili Fort Siriao Fort Bhaddaura Fort Abath Mound Khanpur Fort Auser Fort Malhausi Akupu	197 59 24 212 50 30 218 39 14 223 18 2 237 3 33 244 12 22 258 14 24 269 13 18 273 53 8 291 3 3	MAU, XXIV Chandanpur, XXI Fatehgarh Church Farukhabad Palace Farukhabad Temple Pothári, XXIII Roshanabad House Shamsabad Guri, XXV Jalalabad Dhaka, XXVI	237 257 255 251 252 253 238 263 244 237	MAU, XXIV Chandanpur, XXI Fatehgarh Church Farukhabad Palace Farukhabad Temple Pothári, XXIII Roshanabad House Shamsabad Guri, XXV Jalalabad Dhaka, XXVI	25 329 333 331 25 335 337 26 388 27
KUSMAR, I Semra Fort Tinsmál, VII† Baksua Niwar Tiled Building Bakarua Baksua Fort Baksua Temple Mangrai Building Hardua Tree Dálipur, II Bila Pola Chandla, III Gadakhár Bádsháhpur Bia Barari Rangir, X†	36 57 56 68 22 47 71 h.s. 79 35 57 81 50 27 89 40 15 97 22 51 98 4 55 100 31 45 128 12 55 140 16 36 97 h.s. 189 54 12 193 6 17 196 7 50 52 238 53 6 240 48 48 269 19 23 340 23 21 86	MAUDO s. Bisungarh, XX Pothári, XXIII Chandanpur, XXI MUHAMMADABAD, XXII Bisungarh, XX Pothári, XXIII Chandanpur, XXI MUHAMMADABAD s. Himilia Ataria Gura, XI Baukhar	38 1 37 36 39 40 41 42 44 2 50 55 3 51 52 43 1	MAUDO s. Bisungarh, XX Pothári, XXIII Chandanpur, XXI MUHAMMADABAD, XXII Bisungarh, XX Pothári, XXIII Chandanpur, XXI MUHAMMADABAD s. Himilia Ataria Gura, XI Baukhar	327 326 326 22 23 22 118 117 117 119
MAIHAUSI s. Kursi Mau Building Kalsán, XIX Bhaddaura Fort Orolki Fort Akupu	93 55 24 103 40 54 170 35 54 176 36 44 286 41 11 317 23 11	NAGONATH, VIII Gokulphára, X Kacher Hill Mark Rewábarti Temple Seonri Temple Mardángal Temple Phára, IX Túrah Shergarh Gogora Temple Manang, VII Churári Temple Datiára, V	244 257 244 252 246 245	NAGONATH, VIII Gokulphára, X Kacher Hill Mark Rewábarti Temple Seonri Temple Mardángal Temple Phára, IX Túrah Shergarh Gogora Temple Manang, VII Churári Temple Datiára, V	351 351
MANANG, VII Seyah Datiára, V Nágonáth, VIII Phára, IX Charkhári Fort Malka Temple Thanela, VI	10 12 5 59 34 28 37 114 26 34 88 174 8 57 05 197 8 47 346 15 7 354 55 27 66	PARBATA s. Janjiri, XXIX Unehagaon PARBATA s. Kanwa, XII Jalam Temple No. 1 Sarawan Fort Gijnor Gurgaon Fort Jatoli Tower Charsoni Fort Babai Fort Sarsai Fort Samarhu Fort Nipania, XIII Degan Fort Churki Fort Masuria Fort Banora Fort Ataria Siahari Mound	76 7 8 9 91 90 7	PARBATA s. Janjiri, XXIX Unehagaon PARBATA s. Kanwa, XII Jalam Temple No. 1 Sarawan Fort Gijnor Gurgaon Fort Jatoli Tower Charsoni Fort Babai Fort Sarsai Fort Samarhu Fort Nipania, XIII Degan Fort Churki Fort Masuria Fort Banora Fort Ataria Siahari Mound	171 154 171 144 169 180 159 158 160 170 144 156 157 147 149 145 146
MANTAGARH h.s. Bánsparh Chandla, III Thanela, VI	62 14 8 76 40 13 146 21 43	PARBATA s. Janjiri, XXIX Unehagaon PARBATA s. Kanwa, XII Jalam Temple No. 1 Sarawan Fort Gijnor Gurgaon Fort Jatoli Tower Charsoni Fort Babai Fort Sarsai Fort Samarhu Fort Nipania, XIII Degan Fort Churki Fort Masuria Fort Banora Fort Ataria Siahari Mound	66 67 66	PARBATA s. Janjiri, XXIX Unehagaon PARBATA s. Kanwa, XII Jalam Temple No. 1 Sarawan Fort Gijnor Gurgaon Fort Jatoli Tower Charsoni Fort Babai Fort Sarsai Fort Samarhu Fort Nipania, XIII Degan Fort Churki Fort Masuria Fort Banora Fort Ataria Siahari Mound	351 351

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance
PATHARIA h.s. Tinsmál, VII† Katora Tiled Building	144 24 25 157 2 11	SATPUR, XXVII Janjiri, XXIX Kasrak, XXVIII Bodona Dhaka, XXVI Guri, XXV	35 35 35 92 9	SEONTARA, XVII Seed Phaphand Building Atsu, XVI Harchandpur Fort Lakna Fort Birona, XVIII Bidhuna Kalsán, XIX Bela Fort Mark Aneso Fort Khánpur Fort Jiwa Sirsani Fort Akupu Dabkari Temple Ponti Fort Nandu Saháil Fort Gandasapur, XV	199 204 17 213 216 18 208 19 247 242 235 239 234 240 206 205 17	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78
PHARA, IX Tírúh Shergarh Nágonáth, VIII Mardángarib Temple Revábarti Temple Gokulphára, X Gura, XI Charkhári Fort Manang, VII	h.s. 43 14 10 52 19 1 67 62 9 15 72 38 59 102 10 40 85 159 48 50 32 345 1 37 354 7 47 98	SEOD s. Kakoto Temple Parín Fort Mark (lamp) Atsu, XVI Guári Bidhuna Sahár Fort Seontára, XVII Ponti Fort Nandu Saháil Fort Gandasapur, XV	30 29 340 28 28 285 287 285 286 307 302 292 311 308 312 316 321 320 319 317 284 318 315 285 288 313 284 290 291	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78
POLA h.s. Kusmár, I Dálpur, II Chandla, III	13 7 45 83 57 11 200 59 36	SAMRA h.s. Chandla, III Bansparh Sonha	55 54 54	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78
POTHARI, XXIII Bisungarh, XX Navárganj Guri, XXV Roshanabad House Man, XXIV Farrukhabad Temple Farrukhabad Palace Fategharh Church Chandanpur, XXI Barkhera Mando Muhammadabad, XXII	0 18 57 50 s. 169 21 40 184 8 51 07 204 29 50 243 45 22 50 265 28 21 266 9 10 276 23 10 307 30 13 20 s. 307 31 44 334 10 35 352 4 30 53	SEOD s. Kakoto Temple Parín Fort Mark (lamp) Atsu, XVI Guári Bidhuna Sahár Fort Seontára, XVII Ponti Fort Nandu Saháil Fort Gandasapur, XV	24 334 26 335 25 330 332 338 23 332 326 23	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78
POTLI BAKOARA h.s. Gara Sandna Karri Thanela, VI Mankahri House Pai Temple	h.s. 6 33 19 38 48 29 89 22 29 142 28 44 313 33 34	SANRA h.s. Chandla, III Bansparh Sonha	81 80 80 86 84	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78
RANGIR, X† Tinsmál, VIII† Kusmár, I Bia Barari	106 1 22 39 160 25 38 91 h.s. 186 50 19	SEOD s. Kakoto Temple Parín Fort Mark (lamp) Atsu, XVI Guári Bidhuna Sahár Fort Seontára, XVII Ponti Fort Nandu Saháil Fort Gandasapur, XV	1 1 43	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78
RAULI s. Kasáve Building (lamp) Bisungarh, XX Chandanpur, XXI Amolar Kalsán, XIX	55 4 15 86 38 41 195 55 5 317 22 24 s. 351 18 4	SEOD s. Kakoto Temple Parín Fort Mark (lamp) Atsu, XVI Guári Bidhuna Sahár Fort Seontára, XVII Ponti Fort Nandu Saháil Fort Gandasapur, XV	282 273 274 276 273	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78	SEYAH h.s. Datiára, V Manang, VII Thanela, VI Karri	76 76 77 78

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral. * Of the North-East Longitudinal Series.

Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance
SONHA h.s. Saura Bansparh Talgaon Hill Mark	64 64 65	THANELA, VI Maniagarh Gara Sandna	66 82	TURAH SHERGARH h.s. Gogora Temple Churari Temple	94 98
THANELA, VI Bansparh Karri Tilona Temple Chandla, III Chhatarpur Temple Datiara, V Seyah Lughasi Fort Manang, VII Malka Temple Mankahri House Putli Bakoara	62 78 85 6 60 6 77 89 7 90 86 80	TINSMAL, VII† Daliapur, II Nivar Tiled Building Bakarua Katora Tiled Building Kusmar, I Rangit, X† Patharia	2 36 39 35 1 1 35	UNOHAGAON s. Ismailpur House (lamp) Fatehganj, XXXI Parbata Janjiri, XXIX YANI s. Husapura, XIV Jagamanpur Fort Bareh Temple Bareh Fort Tiar Fort Atsu, XVI Nabada Fort Bason Fort	849 849 851 850 192 194 192 198 196 193 197 195

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

July 1879.

 J. B. N. HENNESSEY,
In charge of Computing Office.

RANGIR MERIDIONAL SERIES.

CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— λ stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically, H_s for the Height when found by spirit leveling, and h for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of λ and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c.; secondary stations by the letters h.s., t.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Abath Mound, (<i>Farrukhabad</i>) Highest point. λ 26 51 20.9 L 79 45 20.3 Nos. 253, 254	Akupu s. (<i>Etāwah</i>) On mound close to the village of same name and about 1½ miles S.E. of Piprauli; thāna, tahsīl and pargana Bidhūna. λ 26 45 34.77 L 79 45 7.56 No. 234	Aneso Fort. (<i>Etāwah</i>) On mound. λ 26 45 38 L 79 41 23 Nos. 242, 243
Agani Fort. (<i>Etāwah</i>) λ 26 53 58 L 79 19 25 No. 300	Aliganj Building, (<i>Bareilly</i>) Flag. λ 28 20 24.2 L 79 17 41.0 No. 354	Āta s. (<i>Jālaun</i>) On highest building on bastion of fort; thāna, tahsīl and pargana Āta. λ 26 2 36.53 L 79 38 53.15 Nos. 129, 130
Airo Fort, (<i>Jālaun</i>) S. W. corner. λ 25 55 47.4 L 79 33 19.0 No. 121	Aman Fort, (<i>Farrukhabad</i>) Highest tower on bastion. λ 26 50 27.3 L 79 52 3.1 No. 266	Atāria, XI†. (<i>Vide page 8—K.</i>) λ 28 38 9.53 L 79 37 42.26 H_s 619.32* h 37.8 No. 33
Airo s. (<i>Farrukhabad</i>) On highest turret of fort, about 1½ miles N. W. of Ronsa village, 1½ miles E. of Rasūlpur and the same distance W.S.W. of the large village of Sakatpur; pargana Sakatpur. λ 26 53 12.60 L 79 33 28.70 Nos. 228, 229	Amolar s. (<i>Farrukhabad</i>) On fort about one mile N. by E. of Maugi and 3½ miles E. by S. of Tālgrām town; thāna Tirwa, pargana Thatia-Tirwa. λ 27 1 45.67 L 79 44 54.31 Nos. 275, 276	Atāria s. (<i>Jālaun</i>) On S.W. bastion of fort; tahsīl Āta. λ 26 4 59.79 L 79 33 0.79 Nos. 113, 114

* This height refers to the mark-stone imbedded at 2 feet above the level of the ground, over which the perforated masonry pillar has been built.
† Of the North-East Longitudinal Series.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Atsara Fort. (Mainpuri)</p> <p>λ 27 3 2 L 79 15 46 No. 317</p> <p>Atsu, XVI. (Vide page 6—K.)</p> <p>λ 26 35 17.34 L 79 23 38.51 H 527 h 26* No. 16</p> <p>Auraiya s. (Etāwah) In town of the same name about 2 miles S. of Málipur, the same distance E. of Mánpur, and the same distance N.N.E. of Shergarh police station; thāna, tahsíl and pargana Auraiya.</p> <p>λ 26 27 56.79 L 79 33 2.50 No. 185</p> <p>Auser Fort, (Farrukhabad) Highest turret.</p> <p>λ 26 48 14.6 L 79 50 16.2 Nos. 262, 263</p> <p>Babai Fort. (Jālaun)</p> <p>λ 26 10 22 L 79 30 14 No. 158</p> <p>Badarwára h.s. (Jhānsi) On a hill about 4 miles N.W. of Daknagar village and 6½ miles S.E. of the large village and Customs Post of Irich; thāna and pargana Gursarai, tahsíl Garotha.</p> <p>λ 25 44 42.76 L 79 13 0.42 No. 100</p> <p>Bádsháhpur h.s. (Damoh) On a hill close to the villages of Gugra, Bankero ruins and Kalkoa.</p> <p>λ 24 22 20.93 L 79 37 43.86 No. 52</p> <p>Bajiri Fort, (Farrukhabad) Centre of bastion.</p> <p>λ 26 57 48 L 79 28 7</p>	<p>Bakarua h.s. (Bundelkhand, Panna State) On a hill close to and S.W. of Biusa village in ruins, about 1½ miles W. of Gobindapur and 1 mile N. of Gogra.</p> <p>λ 24 14 41.07 L 79 11 54.39 H 1768 No. 39</p> <p>Baksua Fort, (Bundelkhand, Panna State) S.W. corner of S.W. turret.</p> <p>λ 24 15 8.7 L 79 19 30.3 No. 40</p> <p>Baksua h.s. (Bundelkhand, Panna State) On a detached hill about a mile S. of village of that name, close to and S.E. of Bírgarh and N.W. of Kohi.</p> <p>λ 24 14 11.13 L 79 19 30.60 H 1813 No. 87</p> <p>Baksua Temple. (Bundelkhand, Panna State) In village.</p> <p>λ 24 15 9.0 L 79 19 45.7 No. 41</p> <p>Bamnora Fort. (Bundelkhand, Bijáwar State)</p> <p>λ 24 26 17 L 79 9 6 H 1305 No. 48</p> <p>Banha Fort, (Jālaun) Tree.</p> <p>λ 26 2 0 L 79 35 29 No. 139</p> <p>Banora Fort, (Jālaun) Flag.</p> <p>λ 26 7 24.6 L 79 30 40.1 No. 149</p> <p>Bansi s. (Etāwah) About ½ mile N. of the bridge over the Ganges Canal, Etāwah Branch, near Kamara village and midway between Phaphúnd and Achalda Railway Stations; thāna, tahsíl and pargana Phaphúnd.</p> <p>λ 26 42 30 L 79 29 33</p>	<p>Bánsparh h.s. (Bundelkhand, Bijáwar State) On a hill about 2 miles N. by W. of Pathár and 2½ miles E. by N. of Majgoa village.</p> <p>λ 24 37 27.16 L 79 47 20.36 H 1991 Nos. 61, 62</p> <p>Baradána Fort. (Etāwah)</p> <p>λ 26 31 12 L 79 37 10 No. 190</p> <p>Barch Fort. (Etāwah)</p> <p>λ 26 30 1 L 79 17 24 No. 198</p> <p>Barch Temple, (Etāwah) Remarkably high.</p> <p>λ 26 29 47.6 L 79 17 21.2 No. 191</p> <p>Bareilly House. (Bareilly) Diwán Bahádur Singh's house in city.</p> <p>λ 28 22 13.1 L 79 26 38.2 No. 353</p> <p>Bareilly Kachahri. (Bareilly)</p> <p>λ 28 20 8.8 L 79 28 2.7 No. 352</p> <p>Bargaon Building. (Jālaun) On N.E. bastion of fort in village.</p> <p>λ 25 57 23.9 L 79 25 50.8 Nos. 123, 124</p> <p>Barhind Fort, (Etāwah) N.W. bastion.</p> <p>λ 26 52 56.0 L 79 31 21.4 Nos. 226, 227</p> <p>Bari Matána Mound, (Sháhjahanpur) Flag.</p> <p>λ 27 52 56 L 79 43 37 No. 342</p>

* Above the level of the elevated platform on which the station is placed.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Barkhera s. <i>(Farrukhabad)</i> On mound about 1 mile S.E. of Kanjhana, same distance N.E. of Hismāpur and 1½ miles W. by N. of Jalāpur on road from Yākutgañj to Ohhibramau town; pargana Bhojpur. λ 27 17 28.85 L 79 35 47.59 Nos. 322, 323	Benora s. <i>(Farrukhabad)</i> On fort about 1½ miles S.W. of Til-sara, 1½ miles S.E. of Firozpur and 2 miles N.E. of Koerna village; pargana Thatia-Tirwa. λ 26 53 35.59 L 79 49 9.94 Nos. 259, 260	Bidhūna s. <i>(Etāwah)</i> On highest turret of fort in the large village of that name, thāna, tahsil and pargana Bidhūna. λ 26 48 10.70 L 79 33 36.27 Nos. 207, 208
Baro Fort, <i>(Etāwah)</i> Bastion. λ 26 55 28.5 L 79 12 56.2 No. 307	Ber s. <i>(Etāwah)</i> On building on mound close to the Ganges Canal, Etāwah Branch, about 3½ miles W.N.W. of Ramāin and 1½ miles S.S.W. of Kura village; thāna, tahsil and pargana Bhārthna. λ 26 48 38.25 L 79 14 16.36 No. 291	Bijāwar Palace. <i>(Bundelkhand, Bijāwar State)</i> N. corner of highest turret. λ 24 37 27.9 L 79 32 5.6 H 1237 No. 71
Barsan s. <i>(Etāwah)</i> On S. side of the road from Phaphūnd to Etāwah, about ½ mile S.W. of Indrapur and ¼ mile N.E. of Indrakūi; tahsil Bhārthna. λ 26 38 58.07 L 79 20 38.39 No. 211	Bhadaura Fort. <i>(Etāwah)</i> λ 26 50 54 L 79 42 39 No. 252	Bijāwar Temple, <i>(Bundelkhand, Bijāwar State)</i> New. λ 24 37 46.5 L 79 32 5.7 H 1195 No. 70
Barsen Fort, <i>(Etāwah)</i> Tree. λ 26 28 1 L 79 35 44	Bhadaura Temple. <i>(Etāwah)</i> λ 26 50 10.0 L 79 44 52.0 Nos. 264, 265	Bila h.s. <i>(Bundelkhand, Bijāwar State)</i> On a hill about 2 miles S.S.E. of Sūrajpur village, 1½ miles N. of Bikanā and 3½ miles S.E. of Kari village. λ 24 28 8.98 L 79 25 24.52 H 1718 Nos. 49, 50
Basait Fort, <i>(Mainpuri)</i> Bastion. λ 26 58 53.6 L 79 18 56.1 No. 310	Bhadek s. <i>(Jālaun)</i> On high pillar close to the right bank of the Jumna, about 1½ miles S.E. of the road from Jālaun to Shergarh Ghāt <i>via</i> Kuthaund police station and 3 miles E. of Salāmpur; thāna Kuthaund, tahsil Jālaun, pargana Bhadek. λ 26 22 21.00 L 79 31 50.32 Nos. 187, 188	Bina Building, <i>(Etāwah)</i> High. λ 26 58 24.5 L 79 11 45.6 No. 311
Bason Fort. <i>(Etāwah)</i> Square building on N.E. bastion. λ 26 27 29.4 L 79 25 22.5 No. 195	Bhoraj, IV. <i>(Vide page 4—K.)</i> λ 24 50 28.71 L 79 5 31.72 H 1358 h Not forthcoming No. 4	Birona, XVIII. <i>(Vide page 6—K.)</i> λ 26 51 2.33 L 79 24 31.35 H 542 h 23* No. 18
Batiagarh Staircase. <i>(Damoh)</i> λ 24 6 48.5 L 79 23 29.7 See Synoptical Vol. of the Calcutta Longitudinal Series of the South-East Quadrilateral.	Bia Barari h.s. <i>(Damoh)</i> On a hill close to the village of that name, about 3 miles S.E. of Kanauna, 3½ miles W.N.W. of Chopra and 2 miles N.E. of Bisdo village. A platform marks the station. λ 24 14 49.60 L 79 30 20.12 H 1694 No. 43	Bisungarh, XX. <i>(Vide page 6—K.)</i> λ 27 6 30.27 L 79 27 15.21 H_s 518.88† h 23.8 No. 20
Baukhar s. <i>(Hamirpur)</i> About 4½ miles S.S.W. of Chandaunt police station and 1½ miles W. of the road from Rāth city to Chandaunt village; thāna Chandaunt, tahsil and pargana Jalāpur. λ 25 51 36.66 L 79 38 41.54 No. 119		
Bela Fort Mark. <i>(Etāwah)</i> λ 26 49 24.78 L 79 43 23.31 Nos. 247, 248		

* Above the terreplein of the fort on which the tower stands.

† This height refers to the mark-stone imbedded at 1 foot above the level of the ground, over which the perforated masonry column has been built.

ation, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
On tree in village close to the left di, about 1½ miles E. of Giridhar- pura N. by E. of Rāmpur and ½ village; thāna and tahsil Jalāla- abad. o ' "	Chhāni Fort, (Jālaun) Building on N.E. bastion. o ' " λ 26 18 10.3 L 79 29 35.7 No. 182	Dantoli Temple. (Jālaun) In fort. o ' " λ 26 1 52.9 L 79 20 11.2 No. 128
27 51 23.37 79 36 55.21 No. 340	Chhatarpur Temple. (Bundelkhand, Chhatarpur State) On hill. λ 24 54 21.0 L 79 37 12.2 H 1198 Nos. 59, 60	Datiāra, V. (Vide page 4—K.) λ 25 6 22.21 L 79 24 52.04 H 1151 h Not forthcoming No. 5
t. 26 41 36 79 24 58 No. 212	Chhibramau Thāna, (Farrukhabad) Flag. λ 27 8 56.3 L 79 32 9.3 Nos. 324, 325	Degaon Fort, (Jālaun) Bungalow. λ 26 9 2.6 L 79 29 53.5 No. 156
N.E. bastion, about 5½ miles N. 26 12 4.2 79 18 54.7 No. 162	Chirauli Fort. (Jālaun) About 4 miles S. by W. of the large vil- lage of Ait. λ 25 50 18.5 L 79 17 47.6 Nos. 109, 110	Deokali Temple. (Etāwah) λ 26 25 52.1 L 79 32 9.7 No. 186
3½ miles S.W. of Āta village, 1½ miles village and 1½ miles N. by W. tahsil and pargana Āta. 26 1 14.98 79 36 12.66 No. 138	Churāri Temple. (Bundelkhand, Naigawan Ribai Jāgr) On hill. λ 25 19 21.2 L 79 35 41.4 No. 93	Dhāka, XXVI. (Vide page 7—K.) λ 27 44 58.41 L 79 43 25.73 H 535 h 38 No. 27
XI. 27 13 33.73 79 41 29.81 508 38 No. 21	Churki Fort. (Jālaun) Close to and E. of the village of that name. λ 26 9 1.4 L 79 33 40.8 No. 157	Dhanora Temple. (Jhānsi) λ 25 43 45.8 L 79 20 5.2 No. 104
24 36 33.38 79 29 45.12 1796 Not forthcoming No. 3	Dabhkari Temple. (Etāwah) On mound. λ 26 43 52.5 L 79 43 36.7 Nos. 240, 241	Dhasān River Temple. (Bundelkhand, Orchha State) λ 24 42 50.5 L 79 17 28.2 H 1381 No. 58
erklāri State) White temple on 25 24 14.2 79 47 53.0 No. 91	Dakoli Temple. (Jhānsi) On hill immediately W. of village of the same name. λ 25 48 12.4 L 79 10 44.0 Nos. 105, 106	Dig Fort, (Etāwah) Highest building. λ 26 54 24.9 L 79 16 48.6 No. 303
out 2½ miles S.E. of Gurgaon 26 10 38.4 79 28 56.1 No. 159	Dālīpur, II. (Vide page 4—K.) λ 24 26 57.43 L 79 11 45.87 H 1599 h Not forthcoming No. 2	

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Dilwári Mound, (Budaun) Flag.</p> <p>λ 28 2 47 L 79 26 55 Nos. 345</p>	<p>Farrukhabad Temple. (Farrukhabad) At Mau Gate of city.</p> <p>λ 27 23 51.9 L 79 35 46.9 Nos. 330, 331</p>	<p>Garar Mound (lamp). (Jālaun) On high building.</p> <p>λ 26 0 53.10 L 79 25 20.28 Nos. 126, 127</p>
<p>Dipkai h.s. (Jhānsi) On a hill close to the village about 1½ miles S.W. of Rāmpura village and 3 miles E. of Bangra; thāna, tahsil and pargana Garoṭha.</p> <p>λ 25 31 15 L 79 20 35</p>	<p>Fatehganj, XXXI. (Vide page 8—K.)</p> <p>λ 28 27 28.69 L 79 21 5.87 H_s 572.12* h 37.9 No. 32</p>	<p>Gara Sandna h.s. (Bundelkhand, Chhatarpur State) On a detached hill close to the villages of Gara and Sandna, about a mile W. of Hatwa and 2½ miles E. of Pāra.</p> <p>λ 24 49 48.28 L 79 50 21.21 Nos. 81, 82</p>
<p>Dorāpur Building. (Etāwah)</p> <p>λ 26 47 40 L 79 35 42</p>	<p>Fatehgarh Church. (Farrukhabad)</p> <p>λ 27 21 58.8 L 79 40 12.5 Nos. 328, 329</p>	<p>Garoṭha Temple. (Jhānsi)</p> <p>λ 25 34 9 L 79 20 39</p>
<p>Dorona s. (Farrukhabad) On fort about a mile W. of Ishwarpur, ½ mile N. of Bijpura and 1½ miles E.S.E. of Baraura village; thāna and pargana Sakráwa.</p> <p>λ 26 56 44.57 L 79 23 7.69 Nos. 287, 288</p>	<p>Gadākhār h.s. (Damoh) On a hill about 1½ miles E. of Bori, 2½ miles N.W. of Garwa and 1½ miles S.W. of Nārāyanpur village on the same range of hills.</p> <p>λ 24 19 14.26 L 79 30 58.51 H 1706 No. 51</p>	<p>Garwai Fort, (Jhānsi) Flag.</p> <p>λ 25 41 17 L 79 15 24 No. 101</p>
<p>Duhelkhand s. (Jālaun) On right bank of the Jumna river, about 1½ miles E. of the village of Nipania and same distance N.N.W. of Ukra village; thāna Nipania, tahsil Ātu, pargana Kālpī.</p> <p>λ 26 12 37.87 L 79 40 47.66 No. 164</p>	<p>Gaili Fort, (Etāwah) Temple in haveli.</p> <p>λ 26 51 17.6 L 79 40 41.1 Nos. 255, 256</p>	<p>Gasáro Fort. (Etāwah)</p> <p>λ 26 42 56 L 79 23 30 Nos. 214, 215</p>
<p>Ekri House (lamp). (Shāhjahānpur)</p> <p>λ 27 44 16.57 L 79 31 30.09 No. 341</p>	<p>Gajnera, XXX. (Vide page 8—K.)</p> <p>λ 28 20 2.02 L 79 40 58.11 H 631 h 38 No. 31</p>	<p>Gijnor s. (Jālaun) Also called Jignor S. on mound, about ¼ mile N.E. of Haripur and 1 mile S. of Biria; thāna, tahsil and pargana Jālaun.</p> <p>λ 26 11 38.19 L 79 24 0.42 Nos. 142, 143</p>
<p>Etāwah Fort (lamp). (Etāwah) At flagstaff on old fort.</p> <p>λ 26 45 34.20 L 79 3 17.75 Nos. 292, 293</p>	<p>Gandaspur, XV. (Vide page 6—K.)</p> <p>λ 26 28 28.98 L 79 38 21.53 H 482 h 28 No. 15</p>	<p>Girthan Fort, (Jālaun) Flag.</p> <p>λ 25 55 12 L 79 22 5 No. 120</p>
<p>Farāidpur Thāna, (Bareilly) Flag.</p> <p>λ 28 12 20.7 L 79 34 44.5 Nos. 346, 347</p>	<p>Gangawāra s. (Mainpuri) On mound about 2½ miles S.W. of Bewar town, 1½ miles S. of Naya Devi on road from Bewar to Bhongaon town and 2½ miles W. of Rāipur; thāna, tahsil and pargana Bhongaon.</p> <p>λ 27 11 32.16 L 79 18 10.28 No. 320</p>	<p>Gogora Temple. (Hamirpur) On hill.</p> <p>λ 25 25 8.3 L 79 35 24.6 No. 94</p>
<p>Farrukhabad Palace, (Farrukhabad) S.W. turret in fort.</p> <p>λ 27 23 50.4 L 79 36 52.2 Nos. 332, 333</p>	<p>Gokulphāra, X. (Vide page 5—K.)</p> <p>λ 25 45 37.06 L 79 19 46.22 H 699 h 12 No. 10</p>	

* This height refers to the mark-stone imbedded at 2 feet above the level of the ground, over which the perforated masonry pillar has been built.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Gopálpur h.s. (<i>Bundelkhand, Bijáwar State</i>) On a range of hills running along the left bank of the Chuhi Nadi, about 1½ miles W. of Lakhangon, 2 miles S. of Bainshori and 2½ miles N.E. of Saganui village.</p> <p>o ' "</p> <p>λ 24 24 41·99 L 79 30 13·81 H 1686 No. 53</p>	<p>Hardua Tree. (<i>Saugor</i>) Also called Híraghát Tree; flag on hill tree.</p> <p>o ' "</p> <p>λ 24 20 38 L 79 14 44 H 1527 Nos. 44, 45</p>	<p>Husapura, XIV. (<i>Vide page 6—K.</i>)</p> <p>o ' "</p> <p>λ 26 21 42·37 L 79 21 30·43 H 500 h 34 No. 14</p>
<p>Guári t.s. (<i>Etáwáh</i>) About 1½ miles N. from the bridge over the Ganges Canal, Etáwáh Branch, near Achaldá Railway Station, on left bank of the Ahnaiya Nadi, about 1½ miles W.N.W. of Khurda and 1½ miles E. of Laituria village; thána, tahsil and pargana Bidhúna.</p> <p>λ 26 44 10·13 L 79 27 10·60 Nos. 209, 210</p>	<p>Haseran Fort, (<i>Farrukhabad</i>) Bungalow.</p> <p>λ 26 55 31·7 L 79 37 5·3 Nos. 232, 233</p>	<p>Indargarh Fort, (<i>Farrukhabad</i>) High square building.</p> <p>λ 26 55 36·6 L 79 43 16·6 No. 258</p>
<p>Gulganj Fort, (<i>Bundelkhand, Bijáwar State</i>) S.W. corner.</p> <p>λ 24 41 53·3 L 79 25 2·1 H 1057 No. 73</p>	<p>Hasri h.s. (<i>Saugor</i>) On a small house S. of village, about ½ mile N.W. of Rámpura village which stands on the opposite bank of the stream running between the two villages and 2 miles S. by R. of Bamnora fort.</p> <p>λ 24 24 11·29 L 79 9 40·82 H 1261 No. 46</p>	<p>Ismailpur House (lamp). (<i>Barcilly</i>)</p> <p>λ 28 18 55·96 L 79 16 28·05 No. 348</p>
<p>Gura, XI. (<i>Vide page 5—K.</i>)</p> <p>λ 25 57 41·39 L 79 36 10·40 H 477 h 33 No. 11</p>	<p>Hatta Jail, (<i>Damoh</i>) S.W. corner.</p> <p>λ 24 7 34 L 79 38 59</p>	<p>Itaura Temple. (<i>Jálaun</i>)</p> <p>λ 26 0 55·7 L 79 44 0·6 No. 137</p>
<p>Gurgaon Fort, (<i>Jálaun</i>) Centre.</p> <p>λ 26 12 22·7 L 79 27 15·6 No. 169</p>	<p>Hatta, Magistrate's House. (<i>Damoh</i>)</p> <p>λ 24 7 7 L 79 38 30</p>	<p>Jagamanpur Fort, (<i>Jálaun</i>) Temple.</p> <p>λ 26 24 17·4 L 79 15 23·0 No. 194</p>
<p>Guri, XXV. (<i>Vide page 7—K.</i>)</p> <p>λ 27 40 0·84 L 79 28 43·22 H 533 h 38 No. 26</p>	<p>Hatta, N. Temple, (<i>Damoh</i>) Spire, N. of Jail.</p> <p>λ 24 8 23·33 L 79 38 49·16 See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p>	<p>Jakha Fort, (<i>Jálaun</i>) Flag on highest building on S.W. bastion.</p> <p>λ 26 17 41·4 L 79 30 18·1 No. 181</p>
<p>Harchandpur Fort. (<i>Etáwáh</i>)</p> <p>λ 26 42 9 L 79 33 40 No. 213</p>	<p>Hatta, S. Temple. (<i>Damoh</i>)</p> <p>λ 24 7 43·9 L 79 38 25·1 See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p>	<p>Jalálabad s. (<i>Sháhjahánpur</i>) On fort, about ½ mile S.W. of Jalálabad town, 1 mile E. of Pitar Mau village and the same distance N.E. of Ahmednagar; thána and pargana Jalálabd.</p> <p>λ 27 43 23·02 L 79 41 53·43 Nos. 338, 339</p>
	<p>Himilia s. (<i>Jálaun</i>) On mound, about 1½ miles S.W. of Usergon, 1½ miles N.E. of Kapási and 2½ miles N. of Kaitheri village on the road Orai to Gursarai; thána, tahsil and pargana Orai.</p> <p>λ 25 58 31·39 L 79 24 8·69 Nos. 115, 116</p>	<p>Jálaun Palace, (<i>Jálaun</i>) Staircase.</p> <p>λ 26 8 37·7 L 79 22 41·4 No. 155</p>
		<p>Jálaun Temple No. I. (<i>Jálaun</i>)</p> <p>λ 26 8 33·6 L 79 22 41·8 Nos. 153, 154</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Jálaun Temple No. 2, (Jálaun) Three domed. ° ' "</p> <p>λ 26 8 50 L 79 22 38</p> <p>Janjiri, XXIX. (Vide page 8—K.)</p> <p>λ 28 10 52·01 L 79 26 43·30 H 584 h 38 No. 30</p> <p>Jankath Fort, (Farrukhabad) White building.</p> <p>λ 26 51 27·9 L 79 54 5·1 No. 267</p> <p>Jaraun Fort, (Etáwáh) High bastion.</p> <p>λ 26 52 37·8 L 79 39 2·6 Nos. 230, 231</p> <p>Jatáshankar Fort. (Damoh) Denoted by a platform.</p> <p>λ 24 13 43·6 L 79 36 5·2 See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Jatoli Tower, (Jálaun) Flag.</p> <p>λ 26 16 21·0 L 79 30 5·9 Nos. 179, 180</p> <p>Jiwa Sirsaini Fort. (Etáwáh)</p> <p>λ 26 44 4 L 79 40 17 No. 239</p> <p>Kacher Hill Mark. (Jhánsi) On a detached hill immediately W. of the village of the same name, 2 miles E.N.E. of Hírá- nagar and 3 miles S.S.E. of the large village of Kakarbai; thána, tahsil and pargana Garotha.</p> <p>λ 25 39 18·72 L 79 23 19·50 No. 99</p> <p>Kaitwa Fort, (Jálaun) White building in centre.</p> <p>λ 26 16 40·1 L 79 24 16·8 No. 175</p>	<p>Kakoto Temple. (Etáwáh) ° ' "</p> <p>λ 26 29 2·2 L 79 34 39·1 Nos. 201, 202</p> <p>Kálpi, Chaurási Temple. (Jálaun) In ruins.</p> <p>λ 26 6 49·6 L 79 46 9·0 No. 165</p> <p>Kálpi s. (Jálaun) On fort close to and N. of town of the same name; thána and pargana Kálpi, tahsil Áta.</p> <p>λ 26 7 51·16 L 79 47 21·98 No. 141</p> <p>Kalra h.s. (Jálaun) On hill, about 1½ miles S. by E. of Jakoli on road from Áta to Jhánsi and 1 mile N.E. of Jam- rahi; thána Ait, tahsil Orai.</p> <p>λ 25 50 26·51 L 79 15 23·00 No. 111</p> <p>Kalsán, XIX. (Vide page 6—K.)</p> <p>λ 26 57 10·27 L 79 41 7·48 H_s 501·22* h 23·1 No. 19</p> <p>Kanwa, XII. (Vide page 5—K.)</p> <p>λ 26 4 8·19 L 79 18 56·14 H 540 h 28† No. 12</p> <p>Karmer s. (Jálaun) In village of same name, about ½ mile W.S.W. of Lebupura and 1½ miles N.N.W. of Gura village; thána, tahsil and pargana Áta.</p> <p>λ 25 59 0·95 L 79 35 21·94 Nos. 134, 135</p> <p>Karri h.s. (Bundelkhand, Chhatarpur State) On a hill close to village of that name and about 2 miles W. by S. of Berauno village.</p> <p>λ 24 52 26·43 L 79 46 32·00 Nos. 78, 79</p>	<p>Karsán Tower. (Jálaun) ° ' "</p> <p>λ 26 0 5 L 79 28 13</p> <p>Karwai Village, (Jálaun) Date trees.</p> <p>λ 25 55 1 L 79 35 34</p> <p>Kasáve Building (lamp). (Farrukhabad)</p> <p>λ 27 4 22·45 L 79 35 5·45 No. 282</p> <p>Kasáve Fort, (Farrukhabad) Flag on house.</p> <p>λ 27 4 23·1 L 79 35 3·0 No. 283</p> <p>Kasboro Fort. (Cawnpore)</p> <p>λ 26 18 17 L 79 42 8 No. 183</p> <p>Kasera Fort, (Mainpuri) Bastion.</p> <p>λ 26 59 17·0 L 79 21 28·6</p> <p>Kasrak, XXVIII. (Vide page 8—K.)</p> <p>λ 28 3 22·65 L 79 42 12·15 H 608 h 38 No. 29</p> <p>Katora Tiled Building. (Saugor)</p> <p>λ 24 9 29·7 L 79 5 26·5 No. 35</p> <p>Katri Temple. (Cawnpore)</p> <p>λ 26 13 25·6 L 79 44 41·4 No. 166</p> <p>Khairnagar Fort. (Farrukhabad)</p> <p>λ 26 52 30 L 79 50 38 No. 268</p>

* This height refers to the mark-stone imbedded at the level of the ground, over which the perforated masonry column has been built.
† Above the terreplein of the fort on which the tower stands.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Khairnagar Temple. (<i>Farrukhabad</i>)</p> <p>λ 26 53 16.1 L 79 51 20.3 No. 270</p>	<p>Kudrail Fort, (<i>Etawah</i>) Building on N.W. bastion.</p> <p>λ 26 54 15.8 L 79 21 47.2 Nos. 304, 305</p>	<p>Kuthaund Fort, (<i>Jalaun</i>) White building.</p> <p>λ 26 21 52.2 L 79 27 17.5 No. 177</p>
<p>Khánpur Fort, (<i>Farrukhabad</i>) Highest turret.</p> <p>λ 26 49 34.2 L 79 45 43.2 Nos. 235, 236</p>	<p>Kuita s. (<i>Etawah</i>) On fort, about $\frac{1}{2}$ mile W. of a jhál and $1\frac{1}{2}$ miles N.N.E. of Kowa village; thána Usárahár, tahsil and pargana Bharthina.</p> <p>λ 26 56 22.38 L 79 17 47.39 Nos. 289, 290</p>	<p>Kuthaund Temple. (<i>Jalaun</i>)</p> <p>λ 26 21 39.9 L 79 27 17.3 No. 176</p>
<p>Khatoli Gateway. (<i>Bundelkhand, Panna State</i>) Tamarind tree on gateway (in ruins).</p> <p>λ 24 34 10.4 L 79 24 21.9 H 1408 No. 57</p>	<p>Kukargaon Building. (<i>Jalaun</i>)</p> <p>λ 26 3 48.4 L 79 26 20.2 No. 140</p>	<p>Laigaon Fort, (<i>Mainpuri</i>) S.W. bastion.</p> <p>λ 26 58 32.7 L 79 21 52.3 No. 309</p>
<p>Khera Bajhera s. (<i>Sháhjahánpur</i>) On mound in village of the same name, about $1\frac{1}{2}$ miles W. of Báhanpur and $1\frac{1}{2}$ miles E. of Bundia Kalán; pargana Khera Bajhera.</p> <p>λ 28 1 39.16 L 79 35 11.06 No. 343</p>	<p>Kumraul Tree, (<i>Farrukhabad</i>) Flag.</p> <p>λ 27 35 7 L 79 36 53</p>	<p>Lakna Fort, (<i>Etawah</i>) Centre of bastion.</p> <p>λ 26 43 47.2 L 79 35 30.4 No. 216</p>
<p>Kishni Fort. (<i>Mainpuri</i>)</p> <p>λ 27 1 29 L 79 18 15 No. 315</p>	<p>Kundalpur Temple, (<i>Damoh</i>) Highest, on hill.</p> <p>λ 23 58 53.6 L 79 46 3.7 See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p>	<p>Lughási Fort, (<i>Bundelkhand, Lughási Jáyár</i>) South or highest tower.</p> <p>λ 25 4 25.3 L 79 37 36.2 No. 89</p>
<p>Korárá Flag. (<i>Etawah</i>)</p> <p>λ 26 32 40 L 79 34 55</p>	<p>Kúrsi s. (<i>Etawah</i>) On mound, about $\frac{1}{2}$ mile N.W. of Bunenpur and $1\frac{1}{2}$ miles E. of Alápur; thána, tahsil and pargana Bidhúna.</p> <p>λ 26 48 6.05 L 79 37 50.25 Nos. 237, 238</p>	<p>Mahewa Building, (<i>Jalaun</i>) Highest.</p> <p>λ 26 7 29.8 L 79 39 49.6 No. 150</p>
<p>Koratha Temple. (<i>Jhánst</i>)</p> <p>λ 25 43 29.1 L 79 17 3.4 No. 103</p>	<p>Kusma Temple. (<i>Bundelkhand, Chhatarpur State</i>) On hill.</p> <p>λ 25 1 29 L 79 46 44</p>	<p>Mainpuri, Court House. (<i>Mainpuri</i>)</p> <p>λ 27 13 49.2 L 79 5 38.7 No. 321</p>
<p>Kotra Temple, (<i>Jalaun</i>) E. minaret.</p> <p>λ 25 48 26.0 L 79 21 4.8 No. 107</p>	<p>Kusmár, I. (<i>Vide page 4—K.</i>)</p> <p>λ 24 14 44.92 L 79 22 51.13 H 1815 h 7 No. 1</p>	<p>Majelo Fort, (<i>Farrukhabad</i>) Flag on building.</p> <p>λ 26 54 29.8 L 79 43 35.0 Nos. 271, 272</p>
<p>Kudarkot Temple. (<i>Etawah</i>)</p> <p>λ 26 48 41.9 L 79 26 15.9 No. 221</p>	<p>Kusmara Fort, (<i>Mainpuri</i>) Bungalow.</p> <p>λ 27 6 34.3 L 79 19 40.6 No. 319</p>	<p>Malhausi s. (<i>Etawah</i>) On highest point in fort, about $1\frac{1}{2}$ miles N.W. of Piprauli, 1 mile E. by S. of Níbhár and 2 miles S.S.W. of the large village of Bela; thána Bela, tahsil and pargana Bidhúna.</p> <p>λ 26 47 47.60 L 79 42 51.45 Nos. 244, 245</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Malka Temple. (<i>Hamirpur</i>) On hill, about $\frac{1}{2}$ of a mile E.N.E. of the junction of roads from Nowgong, Banda and Saugor and $2\frac{1}{2}$ miles S.W. by S. of the village of Srinagar.</p> <p>o ' "</p> <p>λ 25 8 45·1 L 79 47 55·8 No. 90</p> <p>Maman Fort, (<i>Etawah</i>) Highest square building.</p> <p>λ 26 52 7·0 L 79 19 26·9 Nos. 296, 297</p> <p>Manang, VII. (<i>Vide page 5—K.</i>)</p> <p>λ 25 17 28·38 L 79 45 35·16 H_s 1145·63* h 3 No. 7</p> <p>Mangáwan Building, (<i>Etawah</i>) Old.</p> <p>λ 26 59 13·3 L 79 9 56·9 No. 312</p> <p>Mangrai Building. (<i>Bundelkhand, Panna State</i>) A window in S.E. face of a two storied square building in village.</p> <p>λ 24 15 29·6 L 79 18 28·5 No. 42</p> <p>Maniagarh h.s. (<i>Bundelkhand, Chhatarpur State</i>) On a hill close to and S. of Rajgarh, N.W. of Raipura and N.E. of Patan village.</p> <p>λ 24 42 49·73 L 79 58 29·79 H 165† Nos. 66, 67</p> <p>Mankahri House. (<i>Bundelkhand, Chhatarpur State</i>) Dhaukal Singh's house in village.</p> <p>λ 25 0 28·6 L 79 49 14·2 No. 86</p> <p>Mardāngaib Temple. (<i>Hamirpur</i>) On hill.</p> <p>λ 25 36 8·8 L 79 32 31·6 No. 98</p>	<p>Masmaria Fort, (<i>Jalaun</i>) Flag.</p> <p>o ' "</p> <p>λ 26 7 1 L 79 34 11 Nos. 147, 148</p> <p>Man, XXIV. (<i>Vide page 7—K.</i>)</p> <p>λ 27 30 4·20 L 79 42 50·90 H 516 h 38 No. 25</p> <p>Mau Building. (<i>Etawah</i>) On W. bastion of fort.</p> <p>λ 26 52 48·1 L 79 41 13·3 No. 257</p> <p>Mau Saria Temple. (<i>Bundelkhand, Chhatarpur State</i>) On hill, about 3 miles S.E. by E. of the new barracks in Nowgong cantonment.</p> <p>λ 25 0 47·8 L 79 31 46·1 No. 87</p> <p>Maudo s. (<i>Farrukhabad</i>) On house in village, about $\frac{1}{2}$ mile E.S.E. of Atsani and $1\frac{1}{2}$ miles N.E. of Lukraula village; thána and pargana Muhammadabad.</p> <p>λ 27 17 1·09 L 79 30 44·71 Nos. 326, 327</p> <p>Muhammadabad, XXII. (<i>Vide page 7—K.</i>)</p> <p>λ 27 18 24·05 L 79 28 6·98 H 565 h 17† No. 22</p> <p>Muhammadabad s. (<i>Jalaun</i>) In village, about $1\frac{1}{2}$ miles S.W. of Kal-kanda and 2 miles N.E. of Kusmilia; thána and tahsil Orai, pargana Muhammadabad.</p> <p>λ 25 55 56·56 L 79 29 35·01 Nos. 117, 118</p> <p>Mukána Hill Mark. (<i>Bundelkhand, Bijáwar State</i>)</p> <p>λ 24 41 8·05 L 79 49 34·86 No. 83</p>	<p>Munj Building, (<i>Etawah</i>) High.</p> <p>o ' "</p> <p>λ 26 53 47·9 L 79 12 0·7 No. 302</p> <p>Nabáda Fort. (<i>Etawah</i>) Building on top of fort.</p> <p>λ 26 28 30·6 L 79 24 20·9 No. 197</p> <p>Nagar Temple. (<i>Damoh</i>)</p> <p>λ 24 3 15·1 L 79 29 28·9 See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Nágonáth, VIII. (<i>Vide page 5—K.</i>)</p> <p>λ 25 26 54·19 L 79 22 39·73 H 987 h Not forthcoming No. 8</p> <p>Nagroa h.s. (<i>Bundelkhand, Bijáwar State</i>)</p> <p>λ 24 43 19·30 L 79 30 30·56 H 1449 Nos. 68, 69</p> <p>Naili Fort, (<i>Cawnpore</i>) Centre of haveli (in ruins).</p> <p>λ 26 47 1·9 L 79 52 41·9 No. 261</p> <p>Nandu Saháil Fort, (<i>Etawah</i>) Building.</p> <p>λ 26 39 52·9 L 79 40 51·6 No. 205</p> <p>Naráyanpur Fort, (<i>Bundelkhand, Bijáwar State</i>) W. corner of Building.</p> <p>λ 24 40 40·2 L 79 36 43·1 H 1061 No. 72</p> <p>Narsinghgarh Fort, (<i>Damoh</i>) Flag.</p> <p>λ 23 59 55·4 L 79 26 24·4 See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p>

* This height refers to the mark on the upper surface of the circular paka platform.

† Above the bastion of the fort on which the tower stands.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Nawábganj s. (<i>Farrukhabad</i>) On thána in village of the same name, about 1½ miles W. by N. of Sirmua and 1½ miles N.E. of Bīrpur village; thána Nawábganj, tahsil and pargana Shamsabad.</p> <p>λ 27 26 9.65 L 79 26 44.94 No. 334</p> <p>Nibora Temple, (<i>Damoh</i>) Staircase.</p> <p>λ 24 0 55.0 L 79 20 22.3</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Nipania, XIII. (<i>Vide page 5—K.</i>)</p> <p>λ 26 13 30.70 L 79 37 52.27 H 477 h 39 No. 13</p> <p>Nipania Village. (<i>Jálaun</i>)</p> <p>λ 26 12 26 L 79 38 40</p> <p>Niwar Tiled Building. (<i>Bundelkhand, Panna State</i>)</p> <p>λ 24 12 46.6 L 79 7 56.7 No. 36</p> <p>Orai Temple. (<i>Jálaun</i>)</p> <p>λ 25 59 9.8 L 79 29 33.3 Nos. 132, 133</p> <p>Orekhi Fort, (<i>Jálaun</i>) Tree on S.E. bastion.</p> <p>λ 26 11 1.9 L 79 20 18.8 No. 161</p> <p>Oroláki Fort, (<i>Etáwáh</i>) Bastion.</p> <p>λ 26 46 50.5 L 79 46 23.5 No. 246</p> <p>Pai Temple. (<i>Bundelkhand, Ohhatarpur State</i>)</p> <p>λ 24 53 39.6 L 79 56 18.4 No. 84</p>	<p>Pál House, (<i>Jálaun</i>) In village.</p> <p>λ 26 14 47.0 L 79 38 48.1 No. 168</p> <p>Palera Temple, (<i>Bundelkhand, Orchha State</i>) On hill.</p> <p>λ 25 0 39.5 L 79 16 16.7 No. 88</p> <p>Panchamnagar Temple. (<i>Damoh</i>)</p> <p>λ 24 3 41.6 L 79 12 21.1</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Parásan Fort, (<i>Jálaun</i>) Flag.</p> <p>λ 25 56 3 L 79 43 50 No. 181</p> <p>Parásan Temple. (<i>Jálaun</i>)</p> <p>λ 25 56 16.9 L 79 43 52.5 No. 122</p> <p>Parasna Fort, (<i>Etáwáh</i>) Turret.</p> <p>λ 26 57 51.5 L 79 8 32.2 No. 308</p> <p>Parbata s. (<i>Bareilly</i>) In village about ¼ mile W.S.W. of Kīratpur, ½ mile S. of Dothoka and 1½ miles E. by N. of Rámpura village; thána and pargana Farīd-pur.</p> <p>λ 28 14 37.25 L 79 30 9.86 No. 351</p> <p>Parbatpur s. (<i>Jálaun</i>) On mound on road from Jálaun to Kálpi, about 1½ miles W. by N. of Aditpur on the same road and same distance S.E. of Kusmara; thána, tahsil and pargana Jálaun.</p> <p>λ 26 8 16.24 L 79 28 9.31 Nos. 144, 145</p> <p>Parín Fort Mark (lamp). (<i>Etáwáh</i>)</p> <p>λ 26 30 1.73 L 79 31 48.27 No. 203</p>	<p>Patera h.s. (<i>Damoh</i>) On a hill close to and S. of village of the same name and N. of Minwar and about 1½ miles E. of Seria village.</p> <p>λ 24 4 30.47 L 79 26 40.91</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Patharia h.s. (<i>Damoh</i>) On a hill close to and W. of village of the same name and about 2 miles N.N.W. of Bansa.</p> <p>λ 23 53 45.02 L 79 12 42.79</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Perona Fort. (<i>Jálaun</i>)</p> <p>λ 25 51 9 L 79 11 21 No. 112</p> <p>Phaphúnd Building. (<i>Etáwáh</i>) Flag on highest building.</p> <p>λ 26 35 51.2 L 79 30 15.8 No. 204</p> <p>Phára, IX. (<i>Vide page 5—K.</i>)</p> <p>λ 25 41 7.57 L 79 42 54.66 H 637 h Not forthcoming No. 9</p> <p>Pharenji Fort, (<i>Mainpuri</i>) Building.</p> <p>λ 26 59 51.5 L 79 16 25.0 No. 313</p> <p>Pichora Building, (<i>Cawnpore</i>) In village.</p> <p>λ 26 14 34.0 L 79 41 55.4 No. 167</p> <p>Pinarthu Temple. (<i>Cawnpore</i>)</p> <p>λ 26 24 33.8 L 79 38 53.7 No. 189</p> <p>Pola h.s. (<i>Bundelkhand, Bijáwar State</i>) On a detached peak about 2 miles N.W. of Chopra village, 1½ miles N.E. of Biakana and 2½ miles S.E. of Súrjapur village.</p> <p>λ 24 28 22.82 L 79 26 19.18 H 1732 Nos. 54, 55</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Ponti Fort, (Etáwáh) Ruins.</p> <p>λ 26 41 39 L 79 39 53 No. 206</p>	<p>Rasdhán Fort. (Cawnpore) Square Building to N.E.</p> <p>λ 26 21 41.2 L 79 42 8.2 No. 184</p>	<p>Sagauli Temple. (Jhānsi) On hill.</p> <p>λ 25 41 31.1 L 79 9 18.5 No. 102</p>
<p>Pothári, XXIII. (Vide page 7—K.)</p> <p>λ 27 23 16.45 L 79 27 21.41 H 574 h 38 Nos. 23, 24</p>	<p>Rathgaon Fort, (Etáwáh) Flag.</p> <p>λ 26 49 27 L 79 31 54</p>	<p>Sahár Fort, (Etáwáh) Flag.</p> <p>λ 26 45 30 L 79 38 6 Nos. 217, 218</p>
<p>Punja Fort, (Etáwáh) Building.</p> <p>λ 26 53 10.4 L 79 14 37.2 No. 301</p>	<p>Rauli s. (Farrukhabad) On house in village of that name about 1½ miles S.E. of Sikandarpur, 1 mile E. by N. of Singhpur and 1½ miles W. by S. of Daulat Sarai; thána and pargana Chhibramau.</p> <p>λ 27 7 5.32 L 79 39 25.88 Nos. 273, 274</p>	<p>Sahu Building. (Jálaun) On mound.</p> <p>λ 26 12 41.8 L 79 21 56.1 No. 163</p>
<p>Putli Bakoára h.s. (Bundelkhand, Chhatarpur State) On a detached hill close to and S.E. of Bakoára village, 1 mile S. by W. of Seori and ¼ mile N.E. of Putli or Putri.</p> <p>λ 24 57 56.16 L 79 51 22.64 No. 80</p>	<p>Rausen Fort (lamp). (Farrukhabad)</p> <p>λ 26 59 21.86 L 79 35 30.14 Nos. 280, 281</p>	<p>Saipur, XXVII. (Vide page 7—K.)</p> <p>λ 27 54 59.21 L 79 27 5.58 H 539 h 38 No. 28</p>
<p>Ragauli Fort. (Bundelkhand, Bijáwar State) S. W. angle of highest building.</p> <p>λ 24 44 17.4 L 79 33 34.5 H 1226 No. 74</p>	<p>Rewábarti Temple. (Hamirpur) On hill.</p> <p>λ 25 36 33.1 L 79 26 48.7 Nos. 96, 97</p>	<p>Sakráwa s. (Farrukhabad) On building in fort about 1½ miles W. of Rasulpur and ¼ mile E. of Devipur; thána and pargana Sakráwa.</p> <p>λ 26 59 3.96 L 79 27 11.28 Nos. 285, 286</p>
<p>Ráipura Fort, (Jhānsi) Flag.</p> <p>λ 25 35 24 L 79 20.3</p>	<p>Rinia Building. (Jálaun)</p> <p>λ 25 57 36.8 L 79 28 4.9 No. 125</p>	<p>Sámán s. (Mainpuri) On fort about ½ mile S.S.W. of Katra village and ¾ miles W.S.W. of Harchandpur; thána Kishni, tahsil Bhongaon and pargana Kishni-Nabiganj.</p> <p>λ 27 1 26.47 L 79 13 58.02 No. 284</p>
<p>Ráipura Temple. (Jhānsi)</p> <p>λ 25 35 15 L 79 20 14</p>	<p>Roshanabad House, (Farrukhabad) Flag.</p> <p>λ 27 29 43.6 L 79 30 39.3 Nos. 335, 336</p>	<p>Samárhū Fort, (Jálaun) Tree.</p> <p>λ 26 13 8 L 79 36 26 No. 170</p>
<p>Rájnagar Temple. (Bundelkhand, Chhatarpur State) N.W. of town.</p> <p>λ 24 53 40 L 79 57 9</p>	<p>Ruru (Bara) Fort. (Etáwáh) ½</p> <p>λ 26 45 21 L 79 30 19 No. 219</p>	<p>Sandi Fort, (Jálaun) Flag.</p> <p>λ 26 0 35 L 79 38 28 No. 136</p>
<p>Rangír, X.* (Vide page 4—K.)</p> <p>λ 24 0 20.37 L 79 28 26.43 H 1184 h 5 No. 1</p>	<p>Ruru (Chhota) Old Fort, (Etáwáh) Centre, highest wall.</p> <p>λ 26 45 53.5 L 79 28 37.0 No. 220</p>	<p>Sánra h.s. (Bundelkhand, Chhatarpur State) On hill about 1½ miles N.W. of Tipári village and close to and N. of Tipári Ghát and 2 miles S.W. of Raichor village.</p> <p>λ 24 25 33.89 L 79 42 23.69 H 1734 No. 63</p>
	<p>Sabhad Fort, (Etáwáh) Flag on bastion.</p> <p>λ 26 51 40.1 L 79 34 24.4 Nos. 224, 225</p>	

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Sarawan Fort, (Jalaun) Flag on eastern corner of palace.</p> <p>λ 26 14 37.1 L 79 19 52.1 Nos. 171, 172</p> <p>Sarhar Fort, (Jalaun) Flag.</p> <p>λ 26 4 37 L 79 19 3</p> <p>Sarhau Fort, (Etawah) Highest white building.</p> <p>λ 26 49 56.2 L 79 20 29.4 Nos. 294, 295</p> <p>Sarsai Fort. (Jalaun)</p> <p>λ 26 10 47 L 79 31 50 No. 160</p> <p>Sauj Building. (Mainpuri) On mound.</p> <p>λ 27 1 26.3 L 79 11 9.9 No. 316</p> <p>Saunasi Fort. (Mainpuri)</p> <p>λ 27 3 45 L 79 20 11 No. 318</p> <p>Sayyidnagar Temple. (Jalaun)</p> <p>λ 25 48 56.5 L 79 18 31.0 No. 108</p> <p>Semra Fort, (Bundelkhand, Panna State) N.W. tower.</p> <p>λ 24 14 0.1 L 79 22 14.3 No. 38</p> <p>Senpa Temple. (Bundelkhand, Bijawar State) On hill.</p> <p>λ 24 32 25.2 L 79 17 38.6 H 1368 No. 56</p> <p>Seod s. (Etawah) On fort bastion about 2 miles S. of Phaphund Railway Station and 1½ miles E. by S. of Laharkhar; thana, tahsil and pargana Phaphund.</p> <p>λ 26 36 4.01 L 79 36 15.99 Nos. 199, 200</p>	<p>Seonri Temple, (Hamirpur) Spire.</p> <p>λ 25 29 44.6 L 79 24 35.8 No. 95</p> <p>Seontara, XVII. (Vide page 6—K.)</p> <p>λ 26 42 25.60 L 79 37 59.11 H 518 h 17* No. 17</p> <p>Seonthana Fort, (Etawah) Building.</p> <p>λ 26 55 53.6 L 79 19 11.1 No. 306</p> <p>Seyah h.s. (Bundelkhand, Chhatarpur State) On a low range of hills skirting the road from Saugor to Banda, about 2 miles S. by W. of Malara village.</p> <p>λ 25 0 32.99 L 79 42 14.64 Nos. 76, 77</p> <p>Shahabad s. (Shahjahanpur) On tree in village about ¼ mile W. of Kuthua Bhoj, the same distance N.E. of Bahari and ¼ mile S. of Madora; pargana Khara Bajhera.</p> <p>λ 27 57 26.19 L 79 36 1.92 No. 344</p> <p>Shahgarh Fort, (Saugor) N.W. corner of highest building.</p> <p>λ 24 16 27.6 L 79 9 46.1 H 1328 No. 47</p> <p>Shamsabad s. (Farrukhabad) On house in town of that name about 1½ miles N.W. of Alipur, ½ mile N. by E. of Sikandarpur and 1½ miles N.E. of Niwalpur; thana and pargana Shamsabad.</p> <p>λ 27 32 14.71 L 79 28 45.78 No. 337</p> <p>Shamsherganj Fort, (Mainpuri) Bastion.</p> <p>λ 27 0 11.8 L 79 22 12.9 No. 314</p>	<p>Siahari Mound, (Jalaun) Tree.</p> <p>λ 26 5 48 L 79 29 20 No. 146</p> <p>Sikandra s. (Cawnpore) On highest turret of house in town of that name about ½ mile N.W. of Manpur and 2 miles W. by N. of Rasdhan fort; thana and pargana Sikandra.</p> <p>λ 26 21 57.40 L 79 40 16.18 No. 178</p> <p>Siriao Fort, (Etawah) W. bastion.</p> <p>λ 26 50 24.1 L 79 40 15.3 Nos. 250, 251</p> <p>Sirsa Fort, (Jalaun) S.W. building.</p> <p>λ 26 17 22 L 79 28 19</p> <p>Sirsai Fort, (Farrukhabad) Tree on mound.</p> <p>λ 26 49 15.2 L 79 47 53.3 No. 249</p> <p>Sirwabara h.s. (Jhansi) On a detached hill immediately W. of Marha village and N. of Haibathpur; thana, tahsil and pargana Garotha.</p> <p>λ 25 34 24 L 79 16 33</p> <p>Sisgarh, X.† (Vide page 8—K.)</p> <p>λ 28 43 38.07 L 79 21 16.72 H 670 h 38 No. 34</p> <p>Sonar Hill Mark. (Bundelkhand, Bijawar State)</p> <p>λ 24 53 17.33 L 79 27 58.44 No. 75</p> <p>Sonha h.s. (Bundelkhand, Chhatarpur State) On a hill close to and W. of the waterfall N. of Kakra village and S.E. of Kasul Ghat.</p> <p>λ 24 32 12.38 L 79 51 40.08 H 1765 No. 64</p>

* Above the level of summit of the fort tower on which the station is placed.

† Of the North-East Longitudinal Series.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Sukhi Fort. (<i>Farrukhabad</i>) ° ' "</p> <p>λ 26 52 43 L 79 47 5 No. 269</p> <p>Sumáin Fort. (<i>Etáwáh</i>)</p> <p>λ 26 50 57 L 79 28 7 Nos. 222, 223</p> <p>Táka Fort, (<i>Etáwáh</i>) W. bastion.</p> <p>λ 26 52 30·6 L 79 21 59·9 Nos. 298, 299</p> <p>Tálgaon Hill Mark. (<i>Bundelkhand, Panna State</i>)</p> <p>λ 24 34 56·84 L 80 7 18·72 H 1744 No. 65</p> <p>Tarsor Fort, (<i>Jáláun</i>) Window of building on bastion.</p> <p>λ 26 16 8·3 L 79 27 28·5 Nos. 173, 174</p> <p>Thanela, VI. (<i>Vide page 5—K.</i>)</p> <p>λ 24 57 53·79 L 79 47 29·61 H 1098 h Not forthcoming No. 6</p>	<p>Tiar Fort, (<i>Etáwáh</i>) N.E. bastion. ° ' "</p> <p>λ 26 28 19·6 L 79 21 49·4 No. 196</p> <p>Tilona Temple. (<i>Bundelkhand, Chhatarpur State</i>) On hill.</p> <p>λ 24 54 46·7 L 79 46 32·0 No. 85</p> <p>Tinsmál, VII.* (<i>Vide page 3—K.</i>)</p> <p>λ 24 7 12·97 L 79 2 12·45 H 2139 h 9 No. 1</p> <p>Tirwa Palace, (<i>Farrukhabad</i>) Staircase.</p> <p>λ 26 57 44·5 L 79 49 50·6 No. 277</p> <p>Tirwa Temple, (<i>Farrukhabad</i>) Prominent.</p> <p>λ 26 57 45·8 L 79 50 25·1 Nos. 278, 279</p> <p>Tonga Fort, (<i>Cawnpore</i>) Bungalow on S.W. bastion.</p> <p>λ 26 11 45 L 79 46 44</p>	<p>Túrah Shergarh h.s. (<i>Hamírpur</i>) On a detached hill about 4 miles W. N.W. of Kaitha village and same distance N. of the large village of Panwári; thána, tahsil and pargana Ráth.</p> <p>λ 25 29 22·99 L 79 30 45·23 No. 92</p> <p>Unchagaon s. (<i>Bareilly</i>) On mound on left bank of the Rám-ganga river, about 2 miles W. of Bareilly city, 1½ miles S.S.W. of Bákarganj village and 1¼ miles N. by E. of Chaupál; thána Bareilly, pargana Karor.</p> <p>λ 28 20 30·73 L 79 24 50·27 Nos. 349, 350</p> <p>Urgaon Temple. (<i>Jáláun</i>)</p> <p>λ 26 8 1·8 L 79 26 17·6 Nos. 151, 152</p> <p>Usrári Fort, (<i>Etáwáh</i>) Building.</p> <p>λ 26 33 41 L 79 37 12</p> <p>Yani s. (<i>Etáwáh</i>) On centre of W. bastion of fort on road from Phaphúnd to Jhānsi <i>via</i> Daláinagar, about 3 miles W.S.W. of Roshangpur and 4 miles N. of Bijhalpur on N. bank of the Jumna; thána, tahsil and pargana Auraiya.</p> <p>λ 26 27 38·09 L 79 23 10·34 Nos. 192, 193</p>

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

July 1879.

J. B. N. HENNESSEY,
In charge of Computing Office.

RANGIR MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives the present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station
VII*	...	Saugor	Thá., Tah. and P. Banda	Tinsi	... ..
X*	...	Damoh	Tah. Damoh	Rangír	... ..
I	...	Bundelkhand Political Agency	P. Bakswáho	Kusmár	... ..
II	...	„	P. Bijawar	Dálipur	... ..
III	...	„	Ditto.	...	... ..
IV	Bhojraj	„	P. Baldeogarh	Sarkanpur	... ..
V	Chabútara	Hamírpur	Thá. Ajnár, Tah. Kul- pahár, P. Panwári-Jait- pur	Narwara	... ..
VI	...	Bundelkhand Political Agency	P. Chhatarpur	Sela	... ..
VII	Chabútara	Hamírpur	Tah. and Thá. Kulpahár, P. Panwári-Jaitpur	Salat Malat of Garhauí Jágír	... ..
VIII	...	Jhánsi	Tah. Garotha	Gura	... ..
IX	Chabútara	Hamírpur	Thá. Jariya, Tah. and P. Ráth	Phára	... ..

NOTE.—Stations VII* and X* appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station
X	Firangi-ka-Cha-bútara	Jhánsi-Gursarai State	Tah. Garotha	Gokulphára	...
XI	Sorái	Jálaun	Thá. and Tah. Orai	Gura Khurd	In 1872, the District Officer reported the station as completely destroyed by the rains of 1871. In 1873, a paka platform was built by the same Officer for the protection of the mark-stone.
XII	"	"	Thá. and Tah. Jálaun	Kanwa	...
XIII	"	"	Thá. Damrás, Tah. Kálpi	Nipania	...
XIV	"	"	Thá. Kuthaund, Tah. Má-dhogarh	Husapura	...
XV	...	Cawnpore	Thá. and P. Derapur	Gandaspur	The mark-stone in the floor of the arched passage was found intact. The corners at the base of the pillar and the interior of the arched passage much injured by the digging out of bricks.
XVI	...	Etáwah	Tah. and P. Auraiya, Táluka Bhareh, Thá. Ajítmal	Atsu	...
XVII	...	"	Thá. Sahail, Tah. and P. Bidhúna	Seontára	The corners at the base of the pillar and the interior of the arched passage were found considerably injured as at (XV) Gandaspur Station. The hollow in the passage was filled in with burnt bricks.
XVIII	Barona Kalán	"	Thá. Kudarkat, Tah. and P. Bidhúna	Barona Kalán	The mark-stone in the floor of the arched passage was found all right, the corners of the pillar injured at the base.
XIX	Minára	Farrukhabad	Tah. and P. Tirwa	Kalsán	The mark-stone in the floor of the arched passage was found all right, the pillar above the arch cracked.
XX	Mastúl or Minár	"	Tah. and P. Chhibramau	Bisungarh	The mark-stone in the floor of the arched passage was found perfect, as also the pillar.
XXI	Minára or Gar-gaj	"	P. Bhojpur, Tah. Farrukhabad	Rájípur	The mark-stone in the arched passage was found perfect, the arch cracked on one side by the digging out of bricks.
XXII	"	"	P. Muhammadabad, Tah. Farrukhabad	Muhammadabad Khás	The tower considerably dug into at the base, on the east face the excavation reaching the central pillar, the tower was repaired with burnt bricks.

NOTE.—Stations XV to XXXI, also X and XI of the North-East Longitudinal Series, were visited in 1866 by Mr. W. Ivey, Assistant Surveyor, especially deputed for the purpose. The perforated masonry pillars at these stations were found more or less dug into at their bases and bricks extracted from the interior of the arched passages, and otherwise injured by cracks. These pillars were protected by Mr. Ivey as follows:—the arched passages were closed, platforms of sun-dried bricks built around the bases of the pillars to height of from 10 to 14 feet, and the openings at their summits capped by conical mounds to carry off the rain fall; after which all these stations were transferred to the charge of the chief local Officer.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station
XXIII	Minára or Gar- gaj	Farrukhabad	P. Muhammadabad, Tah. Farrukhabad	Pothári	The mark-stone in the floor of the arched passage was found perfect, the interior of the passage and its floor injured.
XXIV	Minára	„	P. Imratpur, Tah. Ali- garh	Mau Rasúlpur	The mark-stone in the floor of the arched passage was found dug out, the pillar much injured and dug into.
XXV	Gundi	Sháhjahánpur	Tah. and P. Jalálabad	Gundi	The mark-stone in the floor of the passage was found perfect, the pillar injured at the base on all sides, and its arch cracked on the east side.
XXVI	Dháka	„	Ditto.	Dháka	Ditto.
XXVII	Sháhpur	Budaun	Thá. and P. Hazratpur, Tah. Dátaganj	Sháhpur	The mark-stone in the floor of the arched passage was found cracked, its central iron pin extracted though the stone appeared to be firmly imbedded, the pillar was slightly injured at the base.
XXVIII	...	Sháhjahánpur	Tah. Tilhar, P. Miráu- pur Katra	Kasrak	The station was found completely destroyed down to the very foun- dation; below the <i>debris</i> the mark- stone was found lying loose, this was embedded below the ground level and a conical pillar, 12 feet in height, built over it, to mark the site of the station.
XXIX	Chanjiri	Bareilly	P. Ballia	Chanjiri	The mark-stone in the floor of the arched passage was found all right, the base of the pillar much injured by the digging out of bricks.
XXX	...	„	P. Farádpur	Gajnara	Ditto.
XXXI	...	„	P. Karor	Fatchganj	... ..
X	...	„	P. Sirsáwán	Sísgarh	... ..
XI	...	„	P. Richha	Atária	... ..

NOTE.—Stations X and XI appertain to the North-East Longitudinal Series.

P. stands for pargana, Tah. for talúq, and Thá for thána.

September, 1882.

 J. B. N. HENNESSEY,
In charge of Computing Office.

List of Published Works of the Great Trigonometrical Survey of India.

An Account of the Measurement of an Arc of the meridian between the parallels of $18^{\circ} 3'$ and $24^{\circ} 7'$, being a continuation of the Grand Meridional Arc of India as detailed by the late Lieutenant-Colonel Lambton in the Volumes of the Asiatic Society of Calcutta. By Captain George Everest, of the Bengal Artillery, F.R.S., &c. London, 1830.

An Account of the Measurement of two Sections of the Meridional Arc of India, bounded by the parallels of $18^{\circ} 3' 5''$; $24^{\circ} 7' 11''$; and $29^{\circ} 30' 18''$. By Lieutenant-Colonel Everest, F.R.S., &c., late Surveyor General of India, and his Assistants. London, 1847.

Account of the Operations of the Great Trigonometrical Survey of India.

- Volume I. The Standards of Measure and the Base-Lines, also an Introductory Account of the early Operations of the Survey, during the period of 1800-1830. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey. Dehra Dún, 1870.
- Do. II. History and General Description of the Principal Triangulation and of its Reduction. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.
- Do. III. The Principal Triangulation, the Base-Line Figures, the Karáchi Longitudinal, N.W. Himalaya, and Great Indus Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1873.
- Do. IV. The Principal Triangulation, the Great Arc (Section 24° - 30°), Rahún, Gurbágarh and Jogí-Tíla Meridional Series, and the Sutlej Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1876.
- Do. V. Details of the Pendulum Operations by Captains J. P. Basevi, R.E., and W. J. Heaviside, R.E., and of their Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún and Calcutta, 1879.
- Do. VI. The Principal Triangulation of the South-East Quadrilateral including the Great Arc—Section 18° to 24° , the East Coast Series, the Calcutta and the Bider Longitudinal Series, the Jabalpur and the Biláspur Meridional Series, and the Details of their Simultaneous Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1880.

List of Published Works of the Great Trigonometrical Survey of India—(Continued).

Account of the Operations of the Great Trigonometrical Survey of India—(Continued).

- Volume VII. General Description of the Principal Triangulation of the North-East Quadrilateral including the Simultaneous Reduction and the Details of Five of the Component Series, the North-East Longitudinal, the Budhon Meridional, the Rangir Meridional, the Amua Meridional, and the Karára Meridional. Prepared under the directions of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
- Do. VIII. Details of the Principal Triangulation of Eleven of the Component Series of the North-East Quadrilateral, including the following Series; the Gurwáni Meridional, the Gora Meridional, the Hurílaong Meridional, the Chendwár Meridional, the North Párasnáth Meridional, the North Malúncha Meridional, the Calcutta Meridional, the East Calcutta Longitudinal, the Brahmaputra Meridional, the Eastern Frontier—Section 23° to 26° , and the Assam Longitudinal. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
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Synopses of the Results of the Great Trigonometrical Survey of India, comprising Descriptions, Co-ordinates, &c., of the Principal and Secondary Stations and other Fixed Points, of the Several Series of Triangles, as follows;—

- Volume I. The Great Indus Series, or Series *D* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. II. The Great Arc—Section 24° to 30° , or Series *A* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. III. The Karáchi Longitudinal Series, or Series *B* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
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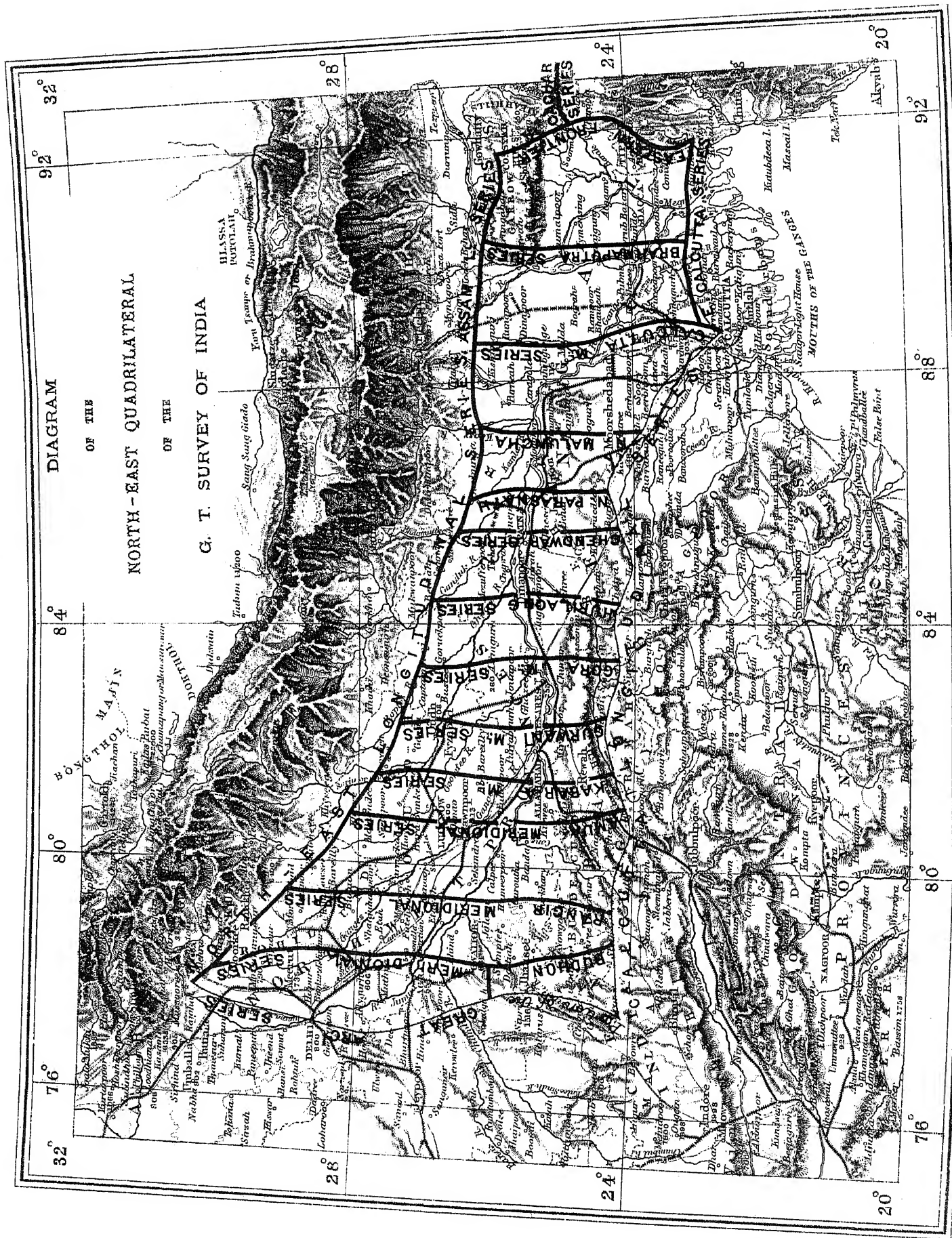
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By Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General
of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1883.

February, 1883.

G. T. SURVEY OF INDIA



SYNOPSIS OF THE RESULTS OF THE OPERATIONS OF
THE GREAT TRIGONOMETRICAL SURVEY OF INDIA
VOLUME XVI.

DESCRIPTIONS AND CO-ORDINATES
OF THE
PRINCIPAL AND SECONDARY STATIONS AND OTHER FIXED POINTS OF
THE AMUA MERIDIONAL SERIES
OR SERIES L
AND THE KARARA MERIDIONAL SERIES
OR SERIES M
OF THE
NORTH-EAST QUADRILATERAL.

BY LIEUT.-GENERAL J. T. WALKER, C.B., R.E., F.R.S., &c., &c.,
SURVEYOR GENERAL OF INDIA, AND SUPERINTENDENT OF THE TRIGONOMETRICAL SURVEY,
AND HIS ASSISTANTS.



Dehra Dun:

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D. V. HUGHES.

1883.

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16— <i>L.</i>	„ 3, lines 2 and 18 from top		
17— <i>L.</i>	„ 3, line 10 from bottom		
„	„ 1, „ 14 „	„ 4	„ 2
18— <i>L.</i>	„ 3, „ 15 from top	„ Jalhotr	„ Jhalotar

KARARA MERIDIONAL SERIES.

vii— <i>M.</i>	footnote, line 3 from bottom	for Chapter II, Vol. II,	read Chapter IV, Vol. II,
17— <i>M.</i>	triangles No. 104 and 105	„ Ganges River No. 2 s.	„ Jumna River No. 2 s.
„	„ 105, 106 and 107	„ „ No. 4 s.	„ „ No. 4 s.
22— <i>M.</i>	col. 1, line 20 from top	}	
„	„ 3, „ 3 „		„ „ No. 2 s.
„	„ 3, „ 4 „		„ „ No. 4 s.
„	„ 5, „ 1 „	„ „ No. 2 s.	„ „ No. 2 s.
„	„ 5, „ 3 „	}	
„	„ 5, „ 20 „		„ „ No. 4 s.
„	„ 5, „ 21 „		„ „ No. 2 s.
23— <i>M.</i>	„ 5, „ 7 from bottom	„ „ No. 4 s.	„ „ No. 4 s.
29— <i>M.</i>	„ 2, „ 6 from top	„ „ No. 2 s.	„ „ No. 2 s.
„	„ 2, „ 16 „	„ „ No. 4 s.	„ „ No. 4 s.
33— <i>M.</i>	„ 1, lines 4 and 9 from bottom	„ Marino	„ Mariaun

February, 1883.

J. B. N. HENNESSEY,
In charge of Computing Office.

REFERENCES.



The abbreviations employed in the text are as follows:—

h.s. denotes hill station secondary

s. „ station secondary

These abbreviations are only placed after stations where a theodolite has been set up and observations taken to surrounding points.

The latitudes and longitudes of all points shown on the Chart at the end of each series will be found in the text. The latter exhibits numerical values of triangles only to points of a superior class, to which alone, if exhibited on the Charts, lines are drawn: the lines are either continuous throughout, or dotted for half the length and continuous for the other half: the dots indicate that the bearing was not observed, and in such cases numerical values of azimuths are not given. For other points, difficult to identify or of comparatively less accuracy, numerical values of triangles or azimuths are not given.

February, 1883.

J. B. N. HENNESSEY,
In charge of Computing Office.

P R E F A C E.

The Amúá and the Karára Meridional Series are the third and the fourth meridional series from the west of the sixteen chains of triangles included in the Section of the Principal Triangulation of the Survey of India which has been named the North-East Quadrilateral. This Section embraces the area within the Meridians of 78° and 92° and the Parallels of 23° and 30° ; and for reasons explained in Section 7 of Chapter I of Volume II of the *Account of the Operations of the Great Trigonometrical Survey*, its general reduction was postponed till that of the neighbouring Quadrilaterals, viz., the North-West and South-East, had been completed, whereby two of the Series, the Great Arc, Section 24° to 30° , and the Calcutta Longitudinal, entering the periphery of the North-East Quadrilateral, became finally fixed. The general principles of the Simultaneous Reduction, and the procedure followed in carrying it out, are the same as have been explained in Volume II of the *Account of the Operations, &c.*, and full details of the whole of the principal triangulation which is at present included in the Quadrilateral, will be found in Volumes VII and VIII of the *Account of the Operations, &c.*

As however the entire contents of the volumes of the principal triangulation are not needed by geographers and surveyors, and moreover as these volumes give no details of the secondary triangulation—which is of considerable value for local requirements—it is obviously desirable that synopses of the final results of the whole of the operations, including the secondary as well as the principal triangulations, should be published for general use, in such a form as to be most suitable for convenience of reference. This has already been done as follows;—

- For the several Series forming the North-West Quadrilateral,
- I. Great Indus Series.
 - II. Great Arc, Section 24° to 30° .
 - III. Karáchi Longitudinal Series.
 - IV. Gurhagarh Meridional Series.
 - V. Rahún Meridional Series.
 - VI. Jogí-Tíla and Sutlej Series.
 - VII. North-West Himalaya Series.

For those also of the South-East Quadrilateral, viz.,

- VIII. Great Arc, Section 18° to 24° .
- IX. Jabalpur Meridional Series.
- X. Bider Longitudinal Series.
- XI. Biláspur Meridional Series.
- XII. Calcutta Longitudinal Series.
- XIII. East Coast Series.

Already published.

And for the following Series of the North-East Quadrilateral,

- XIV. Budhon Meridional Series.
- XV. Rangír Meridional Series.

The present is the 16th Synoptical Volume and the third of those appertaining to the North-East Quadrilateral; and it has been made to include both the Amúá and the Karára Meridional Series, partly because portions of the same districts enter both series and it is therefore convenient to have all the results in one volume, and partly because the available matter is insufficient for two volumes.

It gives the results of the whole of the triangulation executed in connection with these series, both the principal, which was executed with theodolites having azimuthal circles of 15 and 18 inches in diameter read by 3 micrometer microscopes, and the secondary, which was executed with smaller theodolites read by verniers.

By the process of reduction which has been followed the principal triangulation has been rendered perfectly consistent, both internally and externally; internally, so that if in any one of the several polygonal figures of which the chains may be composed, calculations are carried from one station to another in every possible direction, the same results will be inevitably deduced; and externally, so that the values of the co-ordinates of any station, when computed from the given co-ordinates of any other station, with the final linear and angular data, will be the same, whether the calculation is carried directly through the series, or circuitously through any of the other chains of triangles comprising the North-East Quadrilateral. All secondary triangulations which emanate from one side of the principal series and close on another side thereof, or on a contiguous series, have also been made consistent throughout.

As regards the general arrangement of this volume, it is necessary to point out that the several sections have been prepared and printed at different times, and that the work has extended over several years. The Introductions to each series and the Names and Descriptions of the Principal Stations were originally prepared for Volume VII of the *Account of the Operations, &c.*, and when a sufficient number of copies had been printed for that work, additional copies were struck off for the present Synopsis. The Alphabetical and Numerical Lists of Principal Stations, pages 1—*L.* and 2—*L.*, and 1—*M.* and 2—*M.*, as well as the Names and Descriptions of the Principal Stations of the Amúá Series, pages 3—*L.* to 8—*L.*, were printed prior to the year 1868, when the general programme for the final reduction of the whole of the Triangulation of India was drawn up; there was then a long pause in the printing, while the Simultaneous Reductions of the North-West, South-East and North-East Quadrilaterals were being completed; this was done by the year 1877, when the secondary triangulation was adjusted in accordance with the principal, and then the printing of this volume was resumed.

The paging of each series starts from unity and is therefore not continuous throughout this volume. This was necessitated by the order of routine which had to be adopted in printing the successive subjects embraced in each and which is the same for all. The paging of each series is however distinguished by using a capital letter as a subscript to the numerals; thus all the paging which has reference to the Amúá Meridional Series has the subscript *L.*, and that to the Karára Meridional Series the subscript *M.*

The data given in this volume are the following:—

First (pages 1—*L.*, 1—*M.*), alphabetical lists of the names of the principal stations, showing the numbers assigned to them, which were employed in the reductions as being more convenient to use than names.

Second (pages 2—*L.*, 2—*M.*), numerical lists giving the names corresponding to the numbers.

Third (pages 3—*L.*, 3—*M.*), descriptions of the principal stations—of their structure and positions—as taken from the original records of the observations, and supplemented by Addenda (pages 9*—*L.*, 11*—*M.*) giving the most recent information of their condition which has been received up to date.

Fourth (pages 9—*L.*, 11—*M.*), the angles and sides of the principal triangles, numbered and arranged in order from south to north.

Fifth (pages 12—*L.*, 15—*M.*), the angles and sides of certain secondary triangles. The numbering is here made consecutive to that of the principal triangles, in order to facilitate references which are made in other sections to the place where the length of a side is to be found.

Sixth (pages 14—*L.*, 21—*M.*), the azimuths of surrounding stations and points, at principal, principal-auxiliary, and secondary stations, the latter arranged in alphabetical order.

Seventh (pages 17—*L.*, 26—*M.*), the co-ordinates and descriptions of all stations and points arranged in alphabetical order.

The heights of the stations of the Amúá Meridional Series depend in the first instance on the finally determined values of the stations of Amúá and Lakanpúra of the Calcutta Longitudinal Series (of the South-East Quadrilateral), and on the spirit-leveled heights of two stations of the North-East Longitudinal Series, *viz.*, Kutia and Rámnagar, whilst those of the Karára Meridional Series depend on the finally determined values of the stations

of Karára and Marwás of the Calcutta Longitudinal and of Mási of the North-East Longitudinal Series. In addition to these fixed heights, the heights of Stations XVIII, XXVIII, XXIX and XXX of the Amú Meridional Series, and the heights of Stations XVI, XVII, XXX, XXXI and XXXII of the Karára Meridional Series were determined by the Spirit-leveling Operations of this Branch of the Department, and those of Stations XI, XIII and XX of the first named series and of Stations XIX, XX, XXIII, XXVI, and XXVIII of the latter series were determined by similar operations of the Revenue Branch. The manner in which the heights of the remaining stations have been made to accord with those above designated, is explained in Section 7 of Chapter II, Part I of Volume VII of the *Account of the Operations, &c.* The datum to which all heights have been referred is the mean sea level of Karáchi (Kurrachee). It may be here stated that all trigonometrically determined heights invariably refer to the upper surfaces of the central masonry pillars which are constructed for the instruments to stand on. Spirit-leveled values sometimes refer to the upper surface and sometimes to the basement of the pillar, whichever the leveling staff was set on; a description of the exact point referred to is given in each instance in footnotes to the pages of the Co-ordinate Lists, commencing on pages 17—*L*. and 26—*M*. respectively.

It has not been considered necessary to publish the whole of the details of the secondary triangulation, portions having been executed originally for preliminary geographical purposes, to facilitate the construction of a first map of India, and the objects observed having in many instances been flags and temporary marks which must long since have disappeared. The sides and angles of 31 triangles for the Amú Meridional Series and of 133 triangles for the Karára Meridional series, which were selected as most likely to be still in existence and of future use, and the azimuths of all these sides, have been given; but for a number of other points the co-ordinates only have been given. With the aid of Nos. X, XI and XII of the *Auxiliary Tables to facilitate calculations of the Survey Department of India*, Dehra Doon 1868, local surveyors, working on a system of rectangular co-ordinates, can readily transform the spheroidal co-ordinates here given to suit their own requirements.

The Longitudes depend on an astronomically determined value of the longitude of the Madras Observatory, $80^{\circ} 17' 21''$, which was deduced about the year 1815. There has long been reason to believe that this value was about $3'$ too great; but, pending the final determination of the longitude of the Madras Observatory, it has not been considered desirable to alter the value, which has therefore been maintained up to the present time. An electro-telegraphic determination of the longitude of Madras from Greenwich, commencing with the difference between Suez and Greenwich—determined, in 1874, under the superintendence of the Astronomer Royal—was completed in 1877 by the determination of the difference between Suez and Madras, by Captains Campbell and Heaviside, as a part of the operations of this Survey. The combined result places the Observatory at Madras in Long. $5^h 20^m 59^s 42'' = 80^{\circ} 14' 51''.30$. Thus the following precept may be accepted with considerable confidence,—

**All the values of longitude in this volume require a constant correction,
probably of $-2' 30''$.**

As regards the orthography of Indian names in the present volume. The Alphabetical and Numerical Lists of Principal Stations, at the commencement of the volume, were printed before the year 1868, in accordance with the rules introduced by Colonel Everest for use in the Survey Department. Subsequently, in 1874, several provincial lists of spellings, constructed under the immediate orders of the Government of India, were received; and thereafter the newly authorised spellings were adopted for all names and other words contained in these lists; but for words for which there was no specific authority, the spellings have been framed in accordance with the methods followed in the preparation of the published lists, reference being made in the present instance more particularly to the Gazetted Lists for the North-West Provinces and Oudh. As a general rule the pronunciations of the vowels are as follows:—*a* has a variable sound as in woman, rural, paltry; *á* as in tartan; *i* as in bit; *í* as in ravine; *u* as in bull; *ú* as in rural; *o* as in note; *e* as *a* in say; *au* as *ou* in cloud; *ai* as *i* in ride.

The Charts accompanying this volume show the whole of the principal stations and triangulation, the positions of all the secondary points, and those portions of the secondary triangulations of which full details of the angles, sides and azimuths are given. With the aid of the Charts it is hoped that little difficulty will be met with in finding out any of the data which may be required. The descriptions of the secondary stations are in some cases

not as full and clear as is to be desired: this arises from the inadequacy of the information entered on the spot by the surveyors in their field books; every effort has been made to supplement the field books, whenever it was found practicable to do so, in order to facilitate the future identification of the stations; all the information which is forthcoming has now been given.

The general arrangement of this volume and the preparation of the data which it contains have been the work, at different times, of Mr. Hennessey, M.A., F.R.S., Major Herschel, R.E., F.R.S., and Mr. Cole, M.A. Major Herschel moreover supervised the Simultaneous Reduction of the North-East Quadrilateral of which these Series form a portion, while the Introductions to them were written by Mr. C. Wood, Surveyor 2nd Grade. Great pains have been taken to secure the utmost accuracy in preparing the data and passing them through the press.

CALCUTTA,
February, 1883. }

J. T. WALKER, LIEUT.-GENERAL, R.E.,
*Surveyor General, and Superintendent of the
Great Trigonometrical Survey of India.*

AMUA MERIDIONAL SERIES.

AMUA MERIDIONAL SERIES—(LONG. $80^{\circ} 32'$).

INTRODUCTION.

The Amua Series is the third in order, reckoning from west to east, of the meridional chains of triangles included in the North-East Quadrilateral. It follows, as closely as the nature of the country traversed would admit of, the meridian of $80\frac{1}{2}^{\circ}$ East Longitude. It was begun contemporaneously with the series immediately to the westward—the Rangir—and was executed throughout its length as a single chain of triangles. It emanates in the Native State of Nagode and the modern district of Jubbulpore, at the side Amua-Lakanpura of the Calcutta Longitudinal Series; and for the first $1\frac{1}{2}$ degrees of its length, it is carried across the hills which, generally speaking, may be said to form the outliers of the Great Vindhya Range—the southern watershed of the Gangetic plain. In this section, the Series traverses the Native States of Panna and Ohhatarpur at the south-east extremity of Bundelkhand, the states reckoned under the political control of the Baghelkhand Agency, and the British district of Banda; and the triangulation fixes the important towns of Maihar and Panna, the capitals of the Native States respectively so named. It then descends into the valley of the Jumna; and, passing through the Fatehpur and Cawnpore districts in the Doab, strikes the right bank of the Ganges in parallel $26\frac{1}{2}^{\circ}$ N. lat.: in this section, it fixes the position of the towns of Banda and Cawnpore. The Series, after crossing the Ganges, is carried through the north-western portion of Oudh, traversing the modern districts of Unao, Lucknow, Hardoi, Sitapur and Kheri, and is now held to terminate at the side Kokra-Dahlelnagar (xxiii-xxv) of the North-East Longitudinal Series; but it also furnished the two triangles north of this side which have been incorporated in the former series. It was brought to a close in the year 1838-39. Its direct length is 282 miles, covering 4 meridional degrees.

The execution of this Series was entrusted to Lieutenant T. Renny of the Bengal Engineers, who had shortly before been appointed to the Great Trigonometrical Survey, on the recommendation of the Surveyor General, Major Everest, by a General Order in the Military Department dated 23rd July 1832. Lieutenant Waugh, of the Bengal Engineers, was also appointed to the Department about the same time. Both officers were then in Calcutta; they were directed to proceed to Central India to acquire an insight into their new duties by sharing in the operations which were then being carried out on the extensive chain of triangles

known as the Great Arc, under the immediate superintendence of Major Everest. But as in marching from Calcutta to Central India they would have to pass through a region of which it has been said that as little was then known “as of the heart of Africa”, Major Everest instructed them to carry a route-survey through this region and draw up a report of it for submission to the Government. Extracts of his instructions—which are interesting for the evidence they furnish of the urgent demand then existing for every sort of information obtainable for immediate geographical requirements—will be found at pages IV—K and V—K of the Introduction to the Rangir Meridional Series.

With two European Assistants; a native establishment consisting of a nucleus of 24 flagmen, 23 carriers for the large theodolite, 1 native doctor, and 2 harkáras (letter carriers), also 1 havildár, 1 náib, and 12 barkandázes for the protection of the instruments and Government property, and about 130 others for general employment; also with 50 head of baggage cattle, and an

Season 1833-34.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 2nd Assistant.
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„ C. Lane, 3rd „ „

elephant for the office tent,—Lieutenant Renny started from Agra on the 30th November 1833. He was furnished with an 18-inch theodolite* (No. 1) by Troughton and Simms for the principal observations, and such other instruments as were needed for the preliminary operations. The party marched to its ground *viâ* Gwalior, Datia, Jhânsi and Saugor in company with the party which was proceeding under Lieutenant Waugh to the Rangir Series. The co-operation of the Governor General's Agent in Bundelkhand as well as of the Political Agent for Baghelkhand having been secured, an escort of a duffadár's party of horse and a náik's party of foot was obtained at Saugor. The party reached its first station, Amua (xvii, of the Calcutta Longitudinal Series), on the 13th January 1834.

There Lieutenant Renny commenced operations by taking a series of circumpolar star observations for azimuth; his assistants were detached to select forward stations, and while he remained at Amua, he took observations to such hills in the distance as appeared to be suitable for eventual adoption as principal stations. The selection of stations in the direction of the meridian of Amua proved however to be a very difficult matter, because of an elevated table land in front, which was covered with low forest and jungle and could only be crossed by having towers of considerable height built at the stations of the triangulation and clearing the rays between them, as in the plains. After carefully reconnoitering the ground, Lieutenant Renny decided on giving the Series a bend to the east, avoiding the table land and entering a tract of country which presented fewer difficulties, and had the further advantage of enabling him to place his stations “in a cultivated tract rather than on jungly flats.” Sending Mr. Tulloh to the Kaimûr range—where he fixed the station of Patra (ii),—and Mr. Lane to the hill of Dharkána (iv), he himself returned to Lakanpura (xix, of the Calcutta Longitudinal Series) and on 20th February began and completed the measurement of the angle between Amua and Maihar (i). Lieutenant Renny next explored the country to the north-east, and proceeded *viâ* Dharkána (iv) to the Vindhyaçal range, selecting Sârang (vi) and Dâgri (v) stations near the northern confines of Baghelkhand and bringing the Series

* For the history and description of this instrument, see page 65 of Appendix No. 2 to Vol. II. of the *Account of the Operations of the Great Trigonometrical Survey of India*.

back to its own meridian. Mr. Tulloh having succeeded in selecting a station in the plains, proceeded to select the stations of Kartár (vii), Marpha (viii), and Sihonda (ix) which are situated in the Banda district. Lieutenant Renny now considered that his presence was no longer needed on the approximate series, and accordingly returned to resume the final observations, selecting *en route* the station of Potenda (iii). He began observations on the 19th March at Maihar (i); and proceeding thence in order to Amua, Lakanpura, Patra (ii), Potenda (iii), Dharkána (iv), Sárang (vi), Dágri (v), Marpha (viii), Kartár (vii), Sihonda (ix), and Pavia (x), he was able by 23rd June to complete the first ten triangles of the Series, thereby spanning a *meridional* distance of 100 miles and reaching the extremity of the hill tract through which the Series passes.

Lieutenant Renny had hoped to have a large amount of secondary triangulation executed in connection with the principal operations by one of his assistants. The country passed through possesses many places of considerable interest, prominent among which are the celebrated forts of Ajaigarh and Kalinjar which date back for their origin to the Chandel rule nearly 1000 years ago, and the fancied impregnability of whose walls induced their defenders to defy to some purpose even the British arms in the early portion of the present century; Nagode or Unehehra, a rája of which subsequently proved his loyalty by spontaneous support in the critical times of the Indian Mutiny; Panna, a place of considerable beauty and wealth; Maihar, Kothi and Soháwal, all the capitals of the Native States or *jagírs* named after them; and Chitarkot, a notable place of pilgrimage and boasting a sanctity the date of whose origin is lost in the mythical ages of Hindu legendary lore. But in these years the supply of instruments was very inadequate for the requirements of the Survey Department. Lieutenant Renny applied more than once to the Mathematical Instrument Office in Calcutta for a small theodolite for the execution of the proposed secondary triangulation, but on each occasion his application could not be complied with; and late in the season, when the 7-inch theodolite which was employed in the preliminary site selection became available for the secondary triangulation, the hot winds were setting in and the atmospheric conditions were such as to make observing impossible, otherwise than to luminous signals, which were only sufficiently numerous to be employed in the principal triangulation. Thus the secondary determinations, this season, were almost wholly restricted to such as could be made from the principal stations.

Towards the end of the season the approximate series passed out of the hill tracts into the plains. The cutting of lines to clear the rays between the stations became necessary. This at first aroused much opposition on the part of the villagers, and retarded the progress of the operations until such time as the District Officers were able to interfere. Further inconvenience was caused by the people of the country in digging up and carrying away the mark-stones, about which they appear to have entertained superstitious misgivings.

Lieutenant Renny continued his operations into the middle of June, when sickness broke out among the natives in his camp from constant exposure to the vicissitudes of the climate, the rainy season having now commenced. Earnestly commending his last four stations to the care of the Collector of Banda, he turned his steps towards the recess quarters at Cawnpore, which he reached on the 1st of July.

During the recess of 1834, Lieutenant Renny received full instructions from the Surveyor General regarding a new system of selecting stations in the plains by, what was called, ray-tracing, which was to be adopted for laying out the triangulation in advance, and which consisted in running a traverse with a small theodolite and perambulator in the required direction, and

Season 1834-35.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.
Mr. R. C. Tulloh, 3rd Class Sub-Assistant.
„ C. Lane, 3rd „ „

as nearly as possible in a straight line, as described at page 41 of Vol. II. The operations of the ensuing field season were solely directed to the selection of stations, and no principal triangulation was attempted, as Lieutenant Renny's services were required elsewhere for the greater portion of the field season, in assisting at the measurement of the Dehra Dún Base-Line. Leaving in the Ordnance dépôt at Cawnpore his large theodolite and such of his equipment as was required for the principal observations, Lieutenant Renny took the field with his party on the 13th of October. Happily he had at last succeeded in obtaining a second small theodolite, now indispensably necessary for the ray-tracing and other preliminary operations. After fairly starting the work of the field season, he proceeded by dāk to Dehra Dún, where he remained until the end of April, when the measurement of the base-line was completed; he then marched down country to rejoin his party, which he reached early in June, and found still at work on the Gangetic plains between Cawnpore and Lucknow.

The operations had unfortunately been greatly retarded for want of sufficient authority from the Government to support the surveyors in the necessary operations of cutting down all trees and removing all obstacles on the lines between the principal stations. Hitherto the District Officers had generally been ready to aid the surveyors by giving the requisite instructions to the local native officials to co-operate to such extent as might be necessary, and more particularly to assist the surveyors in ascertaining the owners of the removed trees and other obstacles and in estimating the proper amount of compensation to be paid them. But the Collector of Cawnpore, considering that the aid required of him far exceeded his powers to grant, referred the matter to the Commissioner of the Division, by whom it was forwarded for orders to the Secretary to Government in the Judicial Department. The reply was such as to paralyze, for a time, all vigorous prosecution of survey work. The Vice President in Council ruled that “The Officers in charge of the Trigonometrical Survey are not authorized to remove trees or other property without the sanction of the owners previously obtained, and it will rest with those officers to offer such remuneration as will induce the owners to comply with their wishes.” Now in order that the principal triangulation might be advanced at a fairly rapid rate, it was necessary to lay out and complete at least ten new triangles in the course of each field season; the sides of the triangles being of an average length of 14 miles, the clearing of at least twenty perfectly straight 14-mile lines was essentially necessary, and it was generally desirable that this work should be completed during the first half of the field season, so as to allow of the final observations being taken during the remainder of the season. To have raised the tower stations sufficiently high to overlook all intermediate obstacles would—as previous experience had shown—have much retarded, and increased the cost of the operations. Thus line clearing was absolutely necessary; but obviously a number of perfectly straight lines—of an aggregate length of, say, 280 miles—could not be

cleared without cutting down a considerable number of trees, more or less valuable; and if this might not be done without obtaining the sanction of the owners in every instance, the operations would be liable to be so enormously retarded, that they would have to be abandoned. The Surveyor General pointed out these facts to the Government, and prayed for the immediate issue of such orders as would effectually remove the evil. It was then ruled that “the *Tehsildár* or *Peshkár* or other native officials of the district, should invariably accompany “the surveyors, on the grounds that their presence will no doubt, from their superior knowledge “of the inhabitants and of the value of the property, greatly facilitate and expedite agreements “for permission to remove such trees as may interrupt the operations of the survey.” This arrangement had the desired effect, by investing the operations of the surveyors with sufficient authority to silence all further opposition.

By the operations of the present season, the Series stood practically laid out to a little beyond the parallel of 27° in N. lat., having been carried through that portion of Oudh which lies south of the river Gumti. Some delay had occurred in obtaining the requisite authority to carry the operations into the Oudh territory; but the most serious obstacle to progress was the action of the Collector of Cawnpore as already described; thus the out-turn of work was less than Lieutenant Renny had expected his two assistants to accomplish in his absence. Stations were selected over a direct meridional distance of 120 miles, involving the execution of over 250 miles of ray-tracing by the route-survey method.

Before the recess of 1835, Mr. Tulloh resigned his appointment in the Survey Department. No other assistant was available to take his place

Season 1835-36.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.
Mr. O. Lane, 2nd Class Sub-Assistant.

until towards the close of the following field season. Lieutenant Renny took the field earlier than usual in order to make up as well as he could both for the backwardness

in the state of the ray-clearing and for the diminished strength of his party. He took care also to pave the way for an uninterrupted prosecution of the work in prospect by sending copies of the recent orders of Government, on the subject of cutting trees, to the several Civil officials. His progress was accordingly uninterrupted; but the want of a second assistant was much felt, now that all opposition was at an end and the operations could be carried on with vigour. Lieutenant Renny brought several old mud forts into use, by repairing and raising their bastions so as to convert them into principal stations, in doing which he was always careful to fix the lower centre mark in a solid portion of the original structure. Further, as regards the question of the advantages of lofty and expensive towers without line cutting, relatively to low and cheap towers with line cutting—which was still a moot point—Lieutenant Renny found that he could construct towers of earthwork and sundried bricks set in mud, 25 feet high, 16 feet square above and proportionately larger below, with mark-stones at intervals from the basement to the upper surface, at a cost not exceeding Rs. 3 for each foot of height, that is to say for less than Rs. 100 for the highest tower that it was found necessary to erect*. The average cost of clearing the lines between the stations was also found not to exceed Rs. 100, including the

* For details regarding the construction of these towers, see note on page 13 of Part I of Volume VII.

payment of compensation to the owners of the trees felled on the lines*. Thus the cost of each new tower station and of clearing the two rays leading to it did not exceed Rs. 300; whereas a tower sufficiently high to overlook all obstacles on the lines must have been built of the best masonry, and would probably have cost not less than Rs. 2,000; and the time occupied in its construction would have much exceeded what was required for building the simpler structures designed by Lieutenant Renny, and for clearing the rays between them.

Lieutenant Renny cleared the rays up to the side Barauli-Nimkár (xxv-xxvi), and then proceeded with the selection of the stations remaining to complete the Series up to the northern confines of the Oudh territory. And as permission to enter Nepal was withheld by the Government of India, of whom it had been solicited, the selection of stations was brought to a close at the side Rámuápur-Rámnagar (xxii-xxiv) of the North-East Longitudinal Series. During the latter end of April, the party was strengthened by the arrival of Mr. C. Murphy, 2nd Class Sub-Assistant, transferred from the operations on the northern section of the Great Arc, too late however to be of much help during the present field season. Writing from Cawnpore on 3rd June, Lieutenant Renny reported that he had continued clearing the rays between the stations, as long as the atmosphere was sufficiently clear to enable him to see the blue-lights which were burnt at the forward stations, to indicate their position; these blue-lights, when burnt on lofty poles, were usually visible over all intermediate trees and obstacles at the back stations, more particularly if observed at midnight, when very considerable refraction is generally prevalent; their employment thus frequently enabled the required direction of a ray to be exactly determined, without any other procedure; but as this method of operation was not always to be relied on, and depended for its success very much on the condition of the atmosphere, it was eventually superseded by ray-trace triangulations—described at page 42 of Volume II—which, though sometimes more laborious, were always feasible and certain in their results. Lieutenant Renny's subsequent operations, after finding further ray-clearing impossible, are quoted as follows from his report to the Surveyor General. "I conducted a route-survey for the selection of points for principal stations up to the Nepal Hills. At this period, being the middle of last month, fever and other complaints prevalent in the Tarái broke out in my camp, and before I had returned to Sitapur both my Sub-Assistants were dangerously ill, and a great portion of my establishment laid up. As the dimness of the atmosphere at this season would have prevented me doing any more work until the commencement of the rains, and to detain my establishment in camp would only have been exposing them to relapses, I proceeded here as soon as my party was sufficiently convalescent to travel, and am happy in being able to state that my Sub-Assistants are now out of danger, and the Native establishment daily acquiring strength."

The operations of the season enabled Lieutenant Renny to construct two general maps of the country in which the operations had been carried on, compiled from information acquired in the course of the route-survey ray-traces between the principal stations.

* The compensation paid for trees felled on sixteen rays in the Oudh territory was under Rs. 70 per ray on the average; the amount of this award was fixed by an official of His Highness the King of Oudh who had been specially deputed to accompany the party.

The party resumed field operations on the 1st October, Lieutenant Renny commencing operations by taking observations at the station of Jájmau (xviii) which was only 4 miles distant from his recess quarters at Cawnpore, to the three stations, xvi, xvii and xix, at which towers had already been built. He proceeded thence to Máwa (xvi), where he found it necessary to give an addi-

Season 1836-37.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.
Mr. C. Murphy, 2nd Class Sub-Assistant.
„ C. Lane, „ „

tion of 6 feet to the height of the tower; observing there both by day and night*, he was able by the 17th of the month to complete all the observations, horizontal as well as vertical. The next points visited were the hill stations of Sihonda and Pavia (ix and x) which form the side of continuation of the triangulation completed in the first field season; the single angle remaining to be observed at Sihonda (ix) was completed; at Pavia (x) the angle between Sihonda (ix) and Paprendi (xi) was partially observed, the remaining angle being wholly unobserved because the signal at the tower station at Músapur (xii) was invisible. The observation of the principal angles was then discontinued, as the sides of the triangles were of so great a length for operations in the plains that it appears to have been considered hopeless to attempt to measure them until the season of clear atmosphere which occurs during and shortly after the monsoons.

Having deposited in store at Cawnpore his large theodolite and such other portions of the materiel as he would not need, Lieutenant Renny devoted the remainder of the season to clearing rays, building new towers and raising the old ones wherever necessary. About 270 miles of rays were cleared, carrying this portion of the work up to the extreme northern limit of the Series; the heights of the towers at xxi, xxiv and xxv were increased 15 feet, 30 feet towers were erected at stations xxvi, xxviii and xxix, and one of 28—subsequently increased to 35—feet at xxvii.

The services of Lieutenant Renny were lost to the party until the 1st of March 1838, being required at the measurement of the Sironj Base-Line.

Season 1837-38.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.
Mr. C. Murphy, 1st Class Sub-Assistant.
„ C. Lane, 1st „ „

Mr. Murphy accordingly took charge at the commencement of the field season, under the general direction of Lieutenant Renny, and proceeded on the 5th October towards Pavia (x) distant about 70 miles from Cawnpore where the recess quarters were established. On his march thither, he ascertained that the mark at Jahánabad station (xv), on the roof of a paka building, had been removed, and that the owners of the building would not allow it to be replaced. This difficulty was however got over with the assistance of the Magistrate of Fatehpur without retarding the progress of the work. Mr. Murphy arrived at Pavia (x) on the 14th October; and by the 20th he was able to complete all observations of horizontal angles which he believed to be necessary; the vertical angles were not observed as the signals were only visible during the night when refracted very considerably and very irregularly, so that the observations would be worthless unless reciprocated by others taken at the same time at the station under observation. The horizontal angles at Paprendi (xi) were then undertaken and completed; afterwards those at Kánákhra

* The night signals used were either vase-lights or blue-lights, the latter having superseded the former, to be in turn superseded a few years afterwards by powerful lamps with parabolic reflectors.

(xiii) which were all but completed. Mr. Murphy next proceeded to Músapur (xii), where he completed all the horizontal angles in three days, and measured reciprocal verticals with Mr. Lane at Pavia(x), who employed a 7-inch theodolite; these simultaneous verticals were observed on the 4th November to blue-lights, burnt an hour after sunset. Mr. Murphy reached Jáfrabad (xiv) on the 7th November, and by the 11th the three horizontal angles as well as simultaneous verticals on the ray to Músapur (xii) (observed to heliotropes *an hour before sunset*) were measured. The station of Jahánabad (xv) was reached on the 17th: by the 20th the horizontal angles were all disposed of; here simultaneous verticals were observed to lamps on the ray to Jáfrabad (xiv), but though the observations extended over an interval of nearly $2\frac{1}{2}$ hours beginning at an hour after sunset, the results of the means of the measures differed so considerably *inter se* that they were rejected and reserved for future re-measurement. Mr. Murphy remained at Jahánabad while Mr. Lane was marching to Dewarsán (xvii) for simultaneous verticals; they were taken on the 24th at the time of minimum refraction. Mr. Lane proceeded the same day to Jájmau (xviii), while Mr. Murphy advanced to Dewarsán (xvii), and succeeded on that and the following night in completing the two horizontal angles at this station as well as in taking simultaneous verticals on the ray to Jájmau (xviii) with Mr. Lane. On the completion of the observations at Dewarsán (xvii) Mr. Murphy fell ill, and had to proceed to Cawnpore for three weeks, at the end of which he returned to find that the favorable season for observing had ended. Crossing the Ganges into Oudh he resumed work on the 21st December at the station of Rau (xx), where he also took observations for fixing Christ's Church Cawnpore, which was then being built. He waited there five days without being able to obtain complete measures of even a single horizontal angle, though he succeeded in taking simultaneous verticals with Mr. Lane on the ray to Jájmau (xviii). He then recrossed the river and proceeded to Namána (xix) on the right flank of the Series. The winter rains had now set in, and the conditions of the atmosphere became so unfavorable that though he remained at that station from the 4th to the 28th of January, and worked whenever possible both by day and night, he could only obtain complete observations of two of the three horizontal angles; such few measures as were taken of the third angle were rejected and re-observed later on in the season. Pushing on to Jhalotar (xxi) the horizontal angles occupied him from the 3rd to the 14th of February; and thence returning to Rau (xx)—the observations at which had been left unfinished nearly two months before—he finished the work there by the 19th of February. He then proceeded to Etora (xxiii) where the horizontal observations occupied him from the 24th February to the 3rd March; after this he went to Bakseria (xxii) where by the 8th of the month he had completed the three horizontal angles as well as simultaneous verticals with Mr. Lane on the ray to Rau (xx). At this time Lieutenant Renny returned from the Sironj Base-Line and resumed the direct charge of the operations, examining the work performed by Mr. Murphy, affording him incidental aid in the measurement of the angles at Bakseria (xxii), and accompanying him to his next station Asu (xxiv); there the three horizontal angles as well as the simultaneous verticals on the ray to Bakseria (xxii) were measured between the 10th and 14th of March.

An examination of Mr. Murphy's work brought to light the circumstance that certain of his angles were deficient in respect to the number of zeros on which the measurements

had been taken. Lieutenant Renny reported that otherwise his arrangements for conducting the details of the work both expeditiously and economically appeared to have been very good. That no loss of time might be incurred in returning to observe such zeros of his angles as were deficient, Mr. Murphy volunteered to undertake the work during the ensuing rains, at a season of the year not usually devoted to field operations. Mr. Lane's share of the work was also favorably commented on by Lieutenant Renny.

On leaving Asu (xxiv), the party proceeded successively to Barauli (xxv) and Fatehnagar (xxvii), and by the end of March the three horizontal angles at each of these stations were disposed of.

Lieutenant Renny had meanwhile been apprized by the Surveyor General that his services would shortly be needed in carrying on the triangulation of the Great Arc to the south of Sironj; he was directed to proceed to Head Quarters as soon as his presence could be dispensed with on the Amua Series. He was anxious before leaving the party to establish some sort of check on the work that had been already executed; and for this purpose he determined to measure an azimuth of verification at the station of Nimkár (xxvi). He arrived there on the 2nd of April; and by the 16th of the month he completed the azimuthal observations and the measurement of two of the three horizontal angles at that station. The reduction of the azimuthal observations, and various necessary arrangements for the future conduct of the work, occupied Lieutenant Renny till the 1st of May, when he proceeded to Dehra Dún, marching *vid* Bareilly and Hardwár.

Mr. Murphy, now again left to his own resources, resolved to finish at once the insufficiently measured angles to the south in preference to continuing his progress northwards; for he considered that a severe rainy season might possibly set in, and, by forcing him into recess quarters, prevent him from bridging over the gap that then existed in the work. He accordingly retraced his steps to Namána (xix), where a few months previously he had spent several weeks without the weather admitting of his completing the measures of more than two of the three angles; the third angle was now measured in the course of two days. The party then moved southwards to Pavia (x), where all that remained to be done was the completion of a single angle—between ix and xi—by measures on two zeros: this was effected on the 14th June; and by the 23rd of the same month, the deficiencies in the angles at xi and xiii were also made good. Thus, the Series stood complete up to the side (xxvi)-(xxvii), with the exception of the angle at xxvi (Nimkár) between xxiv and xxv. In addition to the tower-building already indicated, seven new tower stations, each 24 feet high, had been constructed at the northern end of the Series, thereby completing this troublesome portion of the operations.

During the field season of 1838-39 Lieutenant Renny merely exercised a general

Season 1838-39.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.

Mr. C. Murphy, 1st Class Sub-Assistant.

„ C. Lane, 1st „ „

supervision over the operations without taking any personal share in them, as he was engaged on the measurement of the principal angles of the section of the Great Arc, to the south of Sironj, between the parallels of 18° and 24° .

The programme for this season's operations was as follows:—to measure the horizontal angles at nine principal stations to complete the Series; to observe an azimuth at Rámuápur,

the most northerly station on the Amua meridian, which was subsequently allotted to the North-East Longitudinal Series; and lastly, to take simultaneous vertical angles over a distance of nearly 200 miles in the length of the Series, so as to form a continuous chain of relative heights of which only seven links stood supplied by the observations of the previous season. With favorable weather all this might be completed in one field season.

Mr. Murphy moved into camp on the 15th October; and, having crossed the Ganges into Oudh, he proceeded to his first station, Nimkár (xxvi), where the angle between xxiv and xxv was duly observed on the 21st idem. The party proceeded thence in succession to the several northern stations, the horizontal angles at which were all disposed of by the 9th of December. The prescribed azimuth was then undertaken by observations to δ Ursæ Minoris at both elongations. By the end of the month the whole of the programme of work was completed, with the exception of the vertical observations. Mr. Lane had fallen ill at the commencement of the field season, and been unable to render any assistance, in consequence of which Mr. Murphy had engaged the temporary services of Mr. C. D. Campbell, a young candidate for employment in the Survey Department. A collision occurred between the men of the native establishment and a large body of armed men in Oudh—who were said to be desperate freebooters, and inhabited a small fort of their own in a jungle on the banks of the Gumti in the vicinity of the survey operations—which might have been attended with much loss of life had not Mr. Murphy been at hand to interpose and protect his people. But otherwise the operations in Oudh seem to have met with no opposition.

The vertical angles, whose measurement was the one thing remaining to complete the Series, were observed simultaneously at the opposite extremities of the rays, by Mr. Murphy at one end with Troughton and Simms' 18-inch theodolite No. 1—with which the whole of the horizontal angles of this Series were measured—and at the other end by either Mr. Lane or Mr. Campbell with a 7-inch theodolite. These operations were carried, under instruction, over the diagonal sides only of the Series, zigzagging from flank to flank, so as to fix every station in turn, but without giving check determinations on the flank sides as well, as that would have doubled the amount of work to be performed. The field operations were concluded on the 2nd of April. The party then proceeded *viâ* Cawnpore to the Surveyor General's Head Quarters at Dehra Dún.

On the completion of the Simultaneous Reduction of the North-East Quadrilateral, it was found that the errors which had actually been dispersed over the Amua Series, between its origin Amua-Lakanpura and terminus Dahlelnagar-Kokra, were as follows:—

In Logarithm of the latter side	+ 0.000,0043,8	= 0.6 inches per mile nearly.
„ Azimuth	„	— 1".286
„ Latitude of Dahlelnagar	+ 0.077	
„ Longitude	„	— 0.173

The trigonometrical heights were checked at several points in subsequent years by connection with the Spirit Leveling Operations in the Trigonometrical and Revenue branches

of the Survey, see page 38 [of Vol. VII]. The sections into which the Series has thus been divided exhibit the following errors:—in the southern section ending at xviii, the maximum discordance was found to be + 7 feet; in the next, ending at the side xxviii–xxix, it was – 14 feet; and in the last section, it was + 4 feet. The errors were dispersed in the manner indicated at pages 38 and 39 of Part I of Volume VII.

Secondary Triangulation.

It will be seen on reference to the chart of this Series that little secondary triangulation was done in connection with the principal operations, excepting what was accomplished from the hill stations at the southern end of the Series. More could not have been done in the plains excepting by carrying chains of minor triangles for which neither the requisite agency nor instrumental equipment were at the time forthcoming. The positions of Sháhjahánpur and other secondary points, near the northern end of the Series, were fixed in the year 1849-50 by Mr. J. O. N. James, in connection with the operations of the North-East Longitudinal Series; it has been found convenient to exhibit the results with those of this Series; they will therefore be found in the Synoptical Volume for this Series.

Compiled, with Addenda by the Surveyor General, by

DEHRA DÚN :
November 1881. }

C. WOOD.

Surveyor 2nd Grade.

AMUA MERIDIONAL SERIES.

ALPHABETICAL LIST OF STATIONS.

Amúa XVII.	Kartár VII.
(of Calcutta Longitudinal Series).	
Asu XXIV.	Kokra XXIII.
	(of North-East Longitudinal Series).
Bakseria XXII.	Lakanpúra XIX.
	(of Calcutta Longitudinal Series).
Baraoli XXV.	Maihar I.
Bulandpúr XXXI.	Marfa VIII.
Dágri V.	Máwa XVI.
Dahlelnagar XXV.	Músápúr XII.
(of North-East Longitudinal Series).	
Daráwal XXVIII.	Namána XIX.
Dewarsán XVII.	Nimkár XXVI.
Dharkána IV.	Paprendi XI.
Etora XXIII.	Parser XXX.
Fatenagar XXVII.	Patra II.
Jafrábád XIV.	Pavia X.
Jájmáo XVIII.	Potenda III.
Jalhotr XXI.	Ráo XX.
Jarúra XXXII.	Sárang VI.
Jehánábád XV	Seonda IX.
Kánákhera XIII.	Sirwaia XXIX.

AMUA MERIDIONAL SERIES.

NUMERICAL LIST OF STATIONS.

XVII	.	.	.	.	Amúa.	XVII	.	.	.	.	Dewarsán.
					(of Calcutta Longitudinal Series).						
XIX	.	.	.	.	Lakanpúra.	XVIII	.	.	.	.	Jájmáo.
					(of Calcutta Longitudinal Series).						
I	.	.	.	.	Maihar.	XIX	.	.	.	.	Namána.
II	.	.	.	.	Patra.	XX	.	.	.	.	Ráo.
III	.	.	.	.	Potenda.	XXI	.	.	.	.	Jalhotr.
IV	.	.	.	.	Dharkána.	XXII	.	.	.	.	Bakseria.
V	.	.	.	.	Dágri.	XXIII	.	.	.	.	Etora.
VI	.	.	.	.	Sárang.	XXIV	.	.	.	.	Asu.
VII	.	.	.	.	Kartár.	XXV	.	.	.	.	Baraoli.
VIII	.	.	.	.	Marfa.	XXVI	.	.	.	.	Nimkár.
IX	.	.	.	.	Seonda.	XXVII	.	.	.	.	Fatenagar.
X	.	.	.	.	Pavia.	XXVIII	.	.	.	.	Daráwal.
XI	.	.	.	.	Paprendi.	XXIX	.	.	.	.	Sirwaia.
XII	.	.	.	.	Músápúr.	XXX	.	.	.	.	Parser.
XIII	.	.	.	.	Kánákhera.	XXXI	.	.	.	.	Bulandpúr.
XIV	.	.	.	.	Jafrábád.	XXXII	.	.	.	.	Jarúra.
XV	.	.	.	.	Jehánábád.	XXIII	.	.	.	.	Kokra.
XVI	.	.	.	.	Máwa.						(of North-East Longitudinal Series).
						XXV	.	.	.	.	Dahlelnagar.
											(of North-East Longitudinal Series).

AMUA MERIDIONAL SERIES.

DESCRIPTION OF STATIONS.



XVII.—(*Of Calcutta Longitudinal Series*). Amúa Hill Station, lat. $24^{\circ} 0'$, long. $80^{\circ} 32'$, is situated in the Maihar district, and stands on the southernmost extremity of the Kaimúr range, immediately to the E. of the village of Amúa. The encamping ground of Siwaganj, on the high road from Mirzapore to Jubbulpore, is distant about 3 miles to the N.

The station is marked by the centre of a circle engraved on a stone which is fixed on the surface of a platform, and placed perpendicularly over a similar stone at the base. The same point was used on the original as well as revised triangulation of the Calcutta Longitudinal Series.

XIX.—(*Of Calcutta Longitudinal Series*). Lakanpúra Hill Station, lat. $24^{\circ} 3'$, long. $80^{\circ} 50'$, is situated in the Maihar district, and stands on a peak of a small range of hills, at a distance of about $1\frac{1}{2}$ miles to the N. of the small village of Lakna or Lakanpúra.

The station is marked by the centre of a circle engraved on a stone which is fixed on the surface of a platform, 2 feet $4\frac{1}{2}$ inches perpendicularly over the mark which was used on the original triangulation of the Calcutta Longitudinal Series. It was found in good preservation when visited in April, 1865, in the course of the revision of the Calcutta Longitudinal Series.

I. Maihar Hill Station, lat. $24^{\circ} 17'$, long. $80^{\circ} 46'$, is situated in the Maihar district, and stands on the eastern extremity of the Bírápáhár, at a distance of about $1\frac{1}{2}$ miles to the N.W. of the town of Maihar.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform about 2 feet high.

II. Patra Hill Station, lat. $24^{\circ} 17'$, long. $81^{\circ} 11'$, is situated in the Rewah district, and stands on the Kaimúr range, about 2 miles E. of the small village of Patra, and 10 miles S.E. of Amarpatan.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform, 2 feet perpendicularly above a similar mark engraved on the rock *in situ*.

III. Potenda Platform Station, lat. $24^{\circ} 37'$, long. $81^{\circ} 0'$, is situated in the Rewah district, and stands on an open plain, about $\frac{3}{4}$ of a mile from the village of Potenda, and 6 miles E. of Mádhogarh.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform, 2 feet perpendicularly above a similar mark engraved on the rock *in situ*.

IV. Dharkána Hill Station, lat. $24^{\circ} 28'$, long. $80^{\circ} 36'$, is situated in the Nagode district, and stands on a detached hill of that name, about 3 miles S. of the small village of Chúnba, and 8 miles from the station of Nagode.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform, $1\frac{1}{2}$ feet perpendicularly above a similar mark engraved on the rock *in situ*.

V. Dágri Hill Station, lat. $24^{\circ} 51'$, long. $80^{\circ} 44'$, is situated in the Nagode district, and stands on the south face of the Bindráchal range, distant about 8 miles to the N. of Koti, and immediately above the small village of Dágri.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform, about $6\frac{1}{2}$ feet perpendicularly above a similar stone well imbedded in the ground.

VI. Sárang Hill Station, lat. $24^{\circ} 46'$, long. $80^{\circ} 24'$, is situated in the Panna district, and stands on a peak of that name in the Bindráchal range, distant about 3 miles S.W. of Ethwán, and 11 miles E. of Panna.

The station is denoted by the centre of a circle engraved on a stone which is fixed in the middle of a platform, about 3 feet perpendicularly above a similar stone flush with the natural surface of the ground.

VII. Kartár Hill Station, lat. $25^{\circ} 2'$, long. $80^{\circ} 23'$, is situated in the Banda district, and stands on a three-peaked isolated hill, close to the high road from Banda to Ságár.

The station is denoted by a dot engraved in the centre of a hole $1\frac{1}{2}$ inches deep cut in the middle of a large boulder about 9 feet square.

VIII. Marfa Hill Station, lat. $25^{\circ} 7'$, long. $80^{\circ} 44'$, is situated in pargana Badaosa of the Banda district, and stands on an isolated hill of that name, on the north face of the Bindráchal range, at a distance of about 10 miles to the W. of Chitarkoti, a place of Hindoo pilgrimage. The hill was formerly fortified, and pretty considerably inhabited, judging from the several large tanks and ruins of buildings which are to be seen.

The station is on the ruins of an old building, and is denoted by the centre of a circle engraved on a stone which is fixed in the middle of a platform, about 5 feet perpendicularly above a similar mark at the level of the ground.

IX. Seonda Hill Station, lat. $25^{\circ} 18'$, long. $80^{\circ} 24'$, is situated in pargana Seonda of the Banda district, and stands on the eastern extremity of an isolated wedge-shaped hill immediately above the village of that name.

The station is denoted by the centre of a circle engraved on a long stone sunk to within 3 inches of the surface of a slightly elevated platform.

X. Pavia Hill Station, lat. $25^{\circ} 27'$, long. $80^{\circ} 47'$, is situated in pargana Seonda of the

Banda district, and stands on a low hill immediately S. of the village of that name. A platform in front of a small temple was used for the station.

The station is denoted by the centre of a circle engraved on a stone which was fixed in the middle of the platform and about $6\frac{1}{2}$ feet perpendicularly above a similar stone imbedded below. The station subsequently required an additional elevation, and an earthen platform 11 feet in height was erected.

XI. Paprendi Tower Station, lat. $25^{\circ} 38'$, long. $80^{\circ} 27'$, is situated in pargana Pailáni of the Banda district, and stands on the centre tower on the east face of the mud fort of Paprendi.

The tower was first repaired, and heightened about 10 feet. This station is full 50 feet above the level of the surrounding country.

XII. Músápúr Tower Station, lat. $25^{\circ} 47'$, long. $80^{\circ} 41'$, is situated in pargana Gházípur of the Fatepúr district, and stands on a mound, elevated about 20 feet above the level of the surrounding country, and lying to the south of the small village of Músápúr.

An earthen platform 23 feet high has been constructed at this station.

XIII. Kánákhera Tower Station, lat. $25^{\circ} 51'$, long. $80^{\circ} 28'$, is situated in pargana Pailáni of the Banda district, and stands on a solid building in the S.E. corner of a fort attached to the village of Kánákhera.

The building was repaired, and heightened about 12 feet, giving it an elevation of full 40 feet above the level of the surrounding country.

XIV. Jafrábád Tower Station, lat. $26^{\circ} 1'$, long. $80^{\circ} 38'$, is situated in pargana Bindki and district Fatepúr, and stands on the N.E. tower of the mud fort adjoining the village of Jafrábád.

The tower was repaired, and heightened 17 feet, and the station is full 40 feet above the level of the surrounding country.

XV. Jehánábád Tower Station, lat. $26^{\circ} 6'$, long. $80^{\circ} 24'$, is situated in pargana Kora and district Fatepúr, and stands on the eastern of two small buildings raised about 9 feet above the roof of a house within a garden, at the S.E. extremity of the town of Jehánábád.

The station is full 40 feet above the level of the surrounding country.

XVI. Máwa Tower Station, lat. $26^{\circ} 16'$, long. $80^{\circ} 34'$, is situated in pargana Sarh Salempúr of the Cawnpore district, and stands on a mound, about 20 feet in height, situated to the N. of the village of Máwa.

An earthen platform 24 feet high has been constructed at this station.

XVII. Dewarsán Tower Station, lat. $26^{\circ} 16'$, long. $80^{\circ} 21'$, is situated in pargana Sarh Salempúr of the Cawnpore district, and stands on the N.W. tower of the inner line of the mud fort attached to the village of Dewarsán.

The tower has an elevation of upwards of 25 feet above the surrounding country, and the station is raised an additional 7 feet.

XVIII. Jájmao Tower Station, lat. $26^{\circ} 26'$, long. $80^{\circ} 27'$, is situated in pargana Jájmao

of the Cawnpore district, and stands on the eastern extremity of the high ground overlooking the Ganges, where formerly stood the fort attached to the village of Jajmáo.

The station is on an earthen platform raised about 8 feet in height.

XIX. Namána Tower Station, lat. $26^{\circ} 28'$, long. $80^{\circ} 39'$, is situated in the Harha district, and stands on a mound, 25 feet high, distant about $\frac{1}{2}$ of a mile to the S. of the village of Namána.

The station is on a earthen platform 18 feet in height.

XX. Ráo Tower Station, lat. $26^{\circ} 39'$, long. $80^{\circ} 30'$, is situated in the Rasúlábád district, and stands on a mound, 25 feet high, distant $\frac{1}{2}$ of a mile N.W. of the village of Ráo.

The station is on an earthen platform $16\frac{1}{2}$ feet in height.

XXI. Jalhotr Tower Station, lat. $26^{\circ} 42'$, long. $80^{\circ} 41'$, is situated in the Rasúlábád district, and stands on the S.W. tower of the fort attached to the village of Jalhotr.

The tower is about 20 feet high, and an additional elevation of 15 feet was obtained by the erection of an earthen platform.

XXII. Bakseria Tower Station, lat. $26^{\circ} 51'$, long. $80^{\circ} 32'$, is situated in the Lassípúr district, and stands on the ruins of an old fort $\frac{1}{2}$ of a mile S. of the small village of Bakseria.

An earthen platform 15 feet in height has been erected, which gives an elevation of about 40 feet above the surrounding country.

XXIII. Etorá Tower Station, lat. $26^{\circ} 54'$, long. $80^{\circ} 42'$, is situated in the Sandaila district, and stands on a mound, about 15 feet in height, distant $\frac{1}{2}$ of a mile W. of the village of Etorá.

An earthen platform 18 feet high has been constructed.

XXIV. Asu Tower Station, lat. $27^{\circ} 5'$, long. $80^{\circ} 31'$, is situated in the Sandaila district, and stands on a mound, 25 feet in height, close to the village of Asu, and distant 2 miles N. of the town of Sandaila.

A platform 30 feet high has been constructed.

XXV. Baraoli Tower Station, lat. $27^{\circ} 8'$, long. $80^{\circ} 43'$, is situated in the Sandaila district, and stands on a mound, 20 feet in height, adjoining the village of Baraoli.

A platform of sun-dried bricks and mud cement 30 feet high has been erected.

XXVI. Nimkár Tower Station, lat. $27^{\circ} 21'$, long. $80^{\circ} 32'$, is situated in the Khairábád district, and stands on a mound, 15 feet high, distant $\frac{1}{2}$ of a mile N.W. of the town of Nimkár, and $\frac{1}{2}$ a mile N. of the Gúmti river.

A platform of paka bricks and mud cement 30 feet high has been erected.

XXVII. Fatenagar Tower Station, lat. $27^{\circ} 24'$, long. $80^{\circ} 43'$, is situated in the Khairábád

district, and stands on an open plain $2\frac{1}{2}$ miles S.E. of the large town of Macherhata, and $\frac{1}{4}$ of a mile S.E. of the village of Bulandpúr.

A platform of sun-dried bricks and mud cement 35 feet high has been erected.

XXVIII. Daráwal Tower Station, lat. $27^{\circ} 34'$, long. $80^{\circ} 31'$, is situated in the Khairábád district, and stands on a mound, about 20 feet high, distant $\frac{1}{2}$ of a mile N.E. of the village of Daráwal.

A tower of sun-dried bricks and mud cement 30 feet high has been erected.

XXIX. Sirwaia Tower Station, lat. $27^{\circ} 38'$, long. $80^{\circ} 41'$, is situated in the Khairábád district, and stands on the highest point of a mound on which, to the N.E. of the station, extends the village of Sirwaia.

A tower of sun-dried bricks and mud cement 30 feet high has been erected.

XXX. Parser Tower Station, lat. $27^{\circ} 46'$, long. $80^{\circ} 32'$, is situated in the Mahamdi district, and stands on a low mound, close to a large tank, distant about $\frac{1}{2}$ a mile to the S.W. of the village of Parser.

A tower of sun-dried bricks and mud cement 24 feet high has been erected here.

XXXI. Bulandpúr Tower Station, lat. $27^{\circ} 51'$, long. $80^{\circ} 43'$, is situated in the Khairábád district, and stands within a small dilapidated mud fort, lying to the S. of the village of Bulandpúr.

A tower of sun-dried bricks and mud cement 24 feet high has been erected here.

XXXII. Jarúra Tower Station, lat. $28^{\circ} 0'$, long. $80^{\circ} 31'$, is situated in the Mahamdi district, and stands within a small dilapidated mud fort, to the west of, and hard by, the village of Jarúra.

A tower of sun-dried bricks and mud cement 28 feet high has been erected here.

XXIII.—(*Of the North-East Longitudinal Series*). Kokra Tower Station, lat. $28^{\circ} 12'$, long. $80^{\circ} 31'$, is situated in tehsíl Haidarábád of the Mahamdi district, and stands on flat ground on the verge of an extensive jungle. The village of Kokra is distant about $1\frac{1}{2}$ miles to the S.W.

The station was constructed in 1833 for the triangulation of the Amúa Meridional Series, as a tower of sun-dried bricks and mud cement, 25 feet in height, with two mark-stones, one 2 feet below the level of the ground, the other at the surface of the tower. The upper mark was found wanting, and the tower in a dilapidated condition when the station was visited in 1843, in the course of the triangulation of the Pilibhít Terai Series. The old structure was then dismantled to the level of the lower mark, and a new tower 26 feet high constructed, with an isolated central paka pillar which contained mark-stones at distances of 2, 6, 12, 18, 24, 27, and 28 feet, respectively, above the lowest mark-stone. When the station was subsequently visited in 1850, in the course of the North-East Longitudinal Series, the upper portion of the pillar and tower were found to have been destroyed. The structure was again dismantled to within 10 feet of the surface of the ground, and a mark-stone having been found there, it was used as a centre over which a new pillar, with an earthen tower around it, was constructed to the height of 26 feet above the level of the ground, which carried a mark-stone at its surface placed in the normal of the lower mark.

XXV.—(*Of the North-East Longitudinal Series*). Dahlelnagar Tower Station, lat. $28^{\circ} 4'$, long. $80^{\circ} 41'$, is situated in tehsil Aliganj of the Mahamdi district, and occupies the highest part of the mound on which the village of Dahlelnagar stands.

A tower of sun-dried bricks and mud cement, 28 feet high, was erected here. It was found in good preservation when the station was visited in 1850, in the course of the triangulation of the North-East Longitudinal Series.

AMUA MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives additional information as to position, construction, and present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Villages surrounding the Station	Remarks on the Construction and Condition of the Station
XVII	Amua	Baghelkhand Agency	Maihar State	Amua	... ..	... ..
XIX	Lakhanpura	Jubbulpore	Thá. Bijerághogarh, Tah. Murwára	Lakhanpura	... ..	... ..
I	Maihar	Baghelkhand Agency	Maihar State	Maihar	... ..	... ..
II	Patra	"	Tál. Amarpátan, Rewah State	...	... ..	... ..
III	Potenda	"	Tál. Mádhogarh, Rewah State	Potenda	... ..	Reported in 1874. "The stones of this station thrown away. A new platform was made on the same spot."
IV	Dharkána	"	Nagode State	Chunaha	... ..	... ..
V	Dágri	"	Kothi State	Dágri	... ..	... ..
VI	Sárang Pahár	Bundelkhand Political Agency	P. Panna	Ahargawa	... ..	... ..
VII	Khairar	Bánda	P. Bánda	Khairar	Kartal N. N. E. $\frac{1}{2}$ miles Khora E. $5\frac{1}{2}$	... ..
VIII	Marpha	"	P. Badausa	Kúlhuán	... ..	Reported in 1867. "The platform fell down last year."

NOTE.—Stations XVII and XIX appertain to the Calcutta Longitudinal Series. P. stands for pargana, Tah. for tahsíl, Thá. for thána, and Tál. for táluks.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Villages surrounding the Station	Remarks on the Construction and Condition of the Station
IX	Sihonda	Bánda	P. Sihonda Girwan	Sihonda Girwan	miles Sihonda Girwan S. $1\frac{3}{4}$ Bahádarpur W. S. W. 3 Gobindpur N. W. $2\frac{3}{4}$	... ..
X	Paunia	"	P. Augási	Paunia	... ..	... ..
XI	Piprenda	"	P. Pailáni	Piprenda	... ..	Portions of the tower washed down by the rain in 1867, and the upper mark-stone reported as lost in 1870.
XII	Músapur	Fatehpur	Tah. Gházipur, P. Mutaaur	Músapur <i>alias</i> Deogaon	Mutaur N. by E. $1\frac{1}{2}$ Simási E. S. E. $\frac{3}{4}$ Paigambarpur N. W. by N. $2\frac{1}{2}$	The pillar tumbled down during the heavy rains of 1872-73 as reported in 1874.
XIII	Kánákhera	Bánda	Tah. and P. Pailáni	Kánákhera	Narauli N. E. by E. $1\frac{1}{2}$ Rámpur W. by S. 3	Portions of the tower washed down by the rain in 1867, and the upper mark-stone reported as lost in 1870.
XIV	Jáfrabad	Fatehpur	Tah. Kaliánpur, P. Kutia Gunír	Jáfrabad	Bindki N. N. W. 2 Kadjua N. W. by W. 5	A part of the tower fallen down, and no mark-stone found, as reported in 1872.
XV	Jahánabad	"	Tah. and P. Kora	Jahánabad	Kora N. $\frac{1}{2}$ Sháhjahánpur W. N. W. 1 Sakrabad E. by N. 2	... ..
XVI	Mahowa	Cawnpore	P. Salámpur	Mahowa	Sirsol W. 1 Kharauli N. N. E. $1\frac{1}{4}$ Domanpur E. S. E. 2	Reported in 1872. "The pillar requires to be rebuilt."
XVII	Deor Sandáh	"	Ditto.	Deor Sandáh	Sárh S. E. 3 Simra E. by N. $1\frac{1}{4}$ Sultánpur N. W. by W. 1	Ditto.
XVIII	Jájmau	"	P. Jájmau	Jájmau	Cawnpore Railway Station W. by N. $4\frac{1}{2}$ Pokarpur W. $1\frac{1}{2}$	... ..
XIX	Newarna	Unao	Tah. Unao, P. Harha, Thá. Achalganj	Newarna	Newarna Rám-sahai N. by E. $\frac{1}{2}$ Pareri Kalán E. 3 Korári Kalán W. by N. 4	Reported in 1873. "Only the foundation exists."

NOTE.—P. stands for pargana, Tah. for tahsíl and Thá. for thána.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Villages surrounding the Station	Remarks on the Construction and Condition of the Station
XX	Rau Kirna	Unao	Tah., P. and Thá. Unao	Rau	Makhi N. E. 1½ Thána S. 2¼	Reported in 1873. "Only the foundation exists."
XXI	...	...	...	...	...	Reported in 1870. "Demolished with the fort (on which it stood) after the Indian Mutiny, and there is no trace of it."
XXII	Garhi Baksar	Unao	Tah. Mohán, P. Asiwan, Thá. Achalganj, Tál. Tikar	Chak Bireswar	Haidarabad S. by E. 2½ Ajgain N. E. 3	Reported in 1873. "There is nothing remaining of it except a few marks of its former existence."
XXIII	Etorá	Lucknow	Tah., P. and Thá. Maliha- bad, Tál. Sai- lamau	Etorá	Bakhtiárnagar E. by S. 3½ Mirzaganj E. N. E. 3½ Bíárigaon W. S. W. 3¼	Platform washed away by rain as reported in 1875.
XXIV	Asu Sarai	Hardoi	Tah., P. and Thá. Sandíla	Asu Sarai	Sandíla E. by S. 2¼	Reported in 1874 as being 24 feet high.
XXV	Barauli	"	Tah. Sandíla, P. Bálamau, Thá. Kachhona	Barauli	Barwan N. E. 2½ Atrauli N. by W. 2¼	Reported in 1874 as being 22 feet high.
XXVI	...	Sitapur	Tah., P. and Thá. Misrikh, Tál. Aurang- abad	Nimkár	Aurangabad E. by S. 4 Beniganj S. W. by S. 4¼	...
XXVII	...	"	Tah. Misrikh, P. Machhreh- ta, Tál. Baria- mau, Thá. Si- tapur	Bulandapur	Kurauna S. W. by W. 4	...
XXVIII	...	"	Tah. Misrikh, Thá. Maholi, Tál. Dundá- wal	Dundáwal	Bihat E. by S. 1 Pisáwan W. N. W. 5½	...
XXIX	...	"	Tah., P. and Thá. Sitapur, Tál. Halna- pur	Sahrohi	Town of Sitapur S. E. by S. 4	...
XXX	...	"	Tah. Misrikh, P. and Thá. Maholi, Tál. Baragaon	Parsera	Baragaon S. S. E. 2 Mitauli N. N. W. 3½	...
XXXI	Bhulanpur	Kheri	Tah. and Thá. Lakhimpur, P. Basarah, Tál. Raja Oel	...	Basarah N. W. 1½ Oel E. by S. 5	...

NOTE.—P. stands for pargana, Tah. for tahsil, Thá. for thána and Tál. for taluka.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Villages surrounding the Station	Remarks on the Construction and Condition of the Station
XXXII	Jaraura	Kheri	Tah. Muhamdi, P. Haidarabad, Tál. Ilá- hibaksh Khán, Thá. Gola	...	Alipur S. by W. 2½ miles Haidarabad N. W. 4½	The station fallen down as reported in 1877.
XXIII	Kokra	„	Tah. Muhamdi, P. Haidarabad	...	Gauri E. by S. 2½ Hardua W. 2 Khamaria S. 1½	The station was constructed in 1833 for the Amua Meridional Series as a tower of sun-dried bricks and mud
<p>cement, 25 feet in height, with two mark-stones, one 2 feet below the level of the ground, the other at the surface of the tower. The upper mark-stone was found wanting, and the tower in a dilapidated condition when visited in 1843, in the course of the operations of the Pilibhít Tarái Series. The old structure was then dismantled to the level of the lower mark, and a new tower 26 feet high constructed, with an isolated central paka pillar which contained mark-stones at distances of 2, 6, 12, 18, 24, 27, and 28 feet, respectively, above the lowest mark-stone. When the station was subsequently visited in 1850, in the course of the North-East Longitudinal Series, the upper portion of the pillar and tower were found to have been destroyed. The structure was again dismantled to within 10 feet of the surface of the ground, and a mark-stone having been found there, it was used as a centre over which a new pillar, with an earthen tower around it, was constructed to the height of 26 feet above the level of the ground, which carried a mark-stone at its surface placed in the normal of the lower mark. Pillar partly fallen down as reported in 1871.</p>						
XXV	...	Kheri	Tah. Lakhimpur, P. Aliganj	...	Bhúrpur S. W. 1½ Aliganj N. W. 4 Khánpur E. N. E. 1	The central pillar as constructed about the year 1838, was enclosed in a tower of sun-dried bricks and mud cement. It was found in good preservation when visited in 1850 in the course of the operations of the North-East Longitudinal Series. Pillar partly fallen down as reported in 1871.

NOTE.—Stations XXIII and XXV appertain to the North-East Longitudinal Series. P. stands for pargana, Tah. for tahsíl, Thá. for thána, and Tál. for táluka.

August, 1882.

J. B. N. HENNESSEY,
In charge of Computing Office.

AMUA MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. TRIANGLES.

NOTE.—The preceding pages, 1—L. to 8—L., having been printed in 1869, the spelling of Indian proper names occurring in them is in accordance with the Departmental or old rules; these prevailed until 1874, when the Government or new rules for spelling were published. The transition now (1878) necessary from the old to the new rules is effected hereafter as follows. Names not already printed are rendered by only one method of spelling, *i.e.*, the new. Any name that has appeared in the preceding pages is given by both methods, *viz.*, in Roman type by the new rules and in Italics by the old; to avoid needless repetitions, this is done *only* in the *first* instance that a name of the kind occurs. It will be seen that the two methods of spelling differ but slightly.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
1	Amua (<i>Amia</i>), XVII	71	42 12 34'93	4'9453592	88177'8	16'700
	Lakanpura (<i>Lakanpura</i>), XIX	71	86 34 48'11	5'1173154	131013'3	24'813
	Maihar, I	71	51 12 36'96	5'0098779	102300'6	19'375
2	Lakanpura, XIX	94	67 44 53'04	5'1427169	138904'7	26'308
	Maihar, I	94	76 16 11'47	5'1637365	145793'0	27'612
	Patra, II	93	35 58 55'49	4'9453592	88177'8	16'700
3	Maihar, I	1'36	59 35 8'07	5'1479144	140577'1	26'624
	Patra, II	1'36	61 58 14'39	5'1580293	143889'6	27'252
	Potenda, III	1'36	58 26 37'54	5'1427169	138904'7	26'308
4	Maihar, I	96	72 14 24'75	5'1590216	144218'7	27'314
	Potenda, III	96	35 55 24'25	4'9486463	88847'7	16'827
	Dharkana, IV	96	71 50 11'00	5'1580293	143889'6	27'252
5	Potenda, III	1'25	67 18 35'20	5'1685977	147434'0	27'923
	Dharkana, IV	1'25	48 12 13'58	5'0760416	119135'6	22'564
	Dagri, V	1'25	64 29 11'22	5'1590216	144218'7	27'314

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Amua, XVII, and Lakanpura, XIX, appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

AMUA MERIDIONAL SERIES.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle			Distance		
						Log. feet	Feet	Miles
6	Dharkána, IV	1'12	50	0	18'10	5'0685557	117099'7	22'178
	Dágri, V	1'12	55	17	42'25	5'0991918	125658'5	23'799
	Sárang, VI	1'12	74	41	59'65	5'1685977	147434'0	27'923
7	Dágri, V	.86	44	9	41'85	4'9816614	95865'3	18'156
	Sárang, VI	.87	77	31	3'11	5'1282360	134349'5	25'445
	Kartár, VII	.86	58	19	15'04	5'0685557	117099'7	22'178
8	Dágri, V	.91	63	6	19'87	5'0971315	125063'8	23'686
	Kartár, VII	.91	43	32	50'56	4'9850344	96612'7	18'298
	Marpha (<i>Marfa</i>), VIII	.91	73	20	49'57	5'1282360	134349'5	25'445
9	Kartár, VII	.94	69	48	26'37	5'1171546	130964'8	24'804
	Marpha, VIII	.93	46	31	24'34	5'0054338	101259'0	19'178
	Sihonda (<i>Seonda</i>), IX	.94	63	40	9'29	5'0971315	125063'8	23'686
10	Marpha, VIII	1'15	64	32	41'82	5'1331946	135892'2	25'737
	Sihonda, IX	1'15	54	58	30'47	5'0907764	123247'0	23'342
	Pavia, X	1'15	60	28	47'71	5'1171546	130964'8	24'804
11	Sihonda, IX	1'09	58	51	54'81	5'1008475	126138'4	23'890
	Pavia, X	1'09	53	53	37'23	5'0757683	119060'6	22'549
	Paprendi, XI	1'10	67	14	27'96	5'1331946	135892'2	25'737
12	Pavia, X	.84	44	37	48'90	4'9732254	94021'1	17'807
	Paprendi, XI	.85	64	53	31'98	5'0834550	121186'7	22'952
	Músapur (<i>Múspúr</i>), XII	.85	70	28	39'12	5'1008475	126138'4	23'890
13	Paprendi, XI	.47	50	18	40'12	4'8804914	75943'6	14'383
	Músapur, XII	.48	57	22	53'89	4'9197257	83123'9	15'743
	Kánákhera, XIII	.48	72	18	25'99	4'9732254	94021'1	17'807
14	Músapur, XII	.44	57	42	48'79	4'8990308	79255'8	15'011
	Kánákhera, XIII	.44	68	11	5'00	4'9397035	87036'9	16'484
	Jáfrabad (<i>Jáfrábád</i>), XIV	.44	54	6	6'21	4'8804914	75943'6	14'383
15	Kánákhera, XIII	.48	56	50	23'65	4'9131469	81874'2	15'506
	Jáfrabad, XIV	.48	69	1	39'89	4'9605784	91322'6	17'296
	Jahánabad (<i>Jehánábád</i>), XV	.48	54	7	56'46	4'8990308	79255'8	15'011
16	Jáfrabad, XIV	.49	52	37	50'95	4'9006164	79545'6	15'065
	Jahánabad, XV	.49	72	29	0'74	4'9797708	95448'9	18'077
	Máwa, XVI	.49	54	53	8'31	4'9131469	81874'2	15'506
17	Jahánabad, XV	.34	59	0	28'68	4'8547637	71575'4	13'556
	Máwa, XVI	.34	48	41	7'49	4'7973573	62713'0	11'877
	Dewarsán, XVII	.34	72	18	23'83	4'9006164	79545'6	15'065
18	Máwa, XVI	.34	59	21	31'50	4'8451257	70004'4	13'258
	Dewarsán, XVII	.34	59	2	13'78	4'8436724	69770'6	13'214
	Jájmau (<i>Jájmao</i>), XVIII	.34	61	36	14'72	4'8547637	71575'4	13'556
19	Máwa, XVI	.34	51	36	32'79	4'8134820	65085'2	12'327
	Jájmau, XVIII	.34	71	13	40'34	4'8955420	78621'6	14'890
	Namána, XIX	.34	57	9	46'87	4'8436724	69770'6	13'214
20	Jájmau, XVIII	.38	67	44	40'81	4'9091738	81128'6	15'365
	Namána, XIX	.38	64	18	42'75	4'8976001	78995'1	14'901
	Rau (<i>Ráo</i>), XX	.37	47	56	36'44	4'8134820	65085'2	12'327

PRINCIPAL TRIANGULATION. TRIANGLES.

11—L.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
21	Namāna, XIX	"	° ' "			
	Rau, XX	37	44 33 21.17	4.7913808	61855.9	11.715
	Jhalotar (<i>Jalhotr</i>), XXI	37	68 29 16.10	4.9139299	82021.9	15.534
22	Rau, XX	37	66 57 22.73	4.9091738	81128.6	15.365
	Jhalotar, XXI	33	63 41 23.19	4.8629283	72933.7	13.813
	Bakseria, XXII	33	66 49 25.52	4.8738795	74796.2	14.166
23	Jhalotar, XXI	33	49 29 11.29	4.7913808	61855.9	11.715
	Bakseria, XXII	32	46 7 20.44	4.7704535	58945.9	11.164
	Etora, XXIII	32	70 46 5.65	4.8876870	77212.4	14.624
24	Bakseria, XXII	32	63 6 33.91	4.8629283	72933.7	13.813
	Etora, XXIII	37	71 59 31.90	4.9343982	85980.2	16.284
	Asu, XXIV	37	67 18 56.98	4.9212456	83415.3	15.798
25	Etora, XXIII	37	40 41 31.12	4.7704535	58945.9	11.164
	Asu, XXIV	42	46 56 50.78	4.8330122	68078.9	12.894
	Barauli (<i>Baraoli</i>), XXV	42	65 42 10.51	4.9289772	84913.6	16.082
26	Asu, XXIV	43	67 20 58.71	4.9343982	85980.2	16.284
	Barauli, XXV	51	70 9 33.39	5.0001742	100040.1	18.947
	Nimkár, XXVI	51	70 2 23.85	4.9998468	99964.7	18.933
27	Barauli, XXV	50	39 48 2.76	4.8330122	68078.9	12.894
	Nimkár, XXVI	46	37 59 26.64	4.8040218	63682.8	12.061
	Fatehnagar (<i>Fatenagar</i>), XXVII	47	66 46 50.46	4.9780865	95079.4	18.007
28	Nimkár, XXVI	47	75 13 42.90	5.0001742	100040.1	18.947
	Fatehnagar, XXVII	37	75 18 17.78	4.9322553	85557.0	16.204
	Darawal, XXVIII	37	58 38 30.72	4.8781217	75530.4	14.305
29	Fatehnagar, XXVII	37	46 3 11.50	4.8040218	63682.8	12.061
	Darawal, XXVIII	36	39 34 3.64	4.7589892	57410.2	10.873
	Sirwaia, XXIX	36	68 45 26.31	4.9242982	84003.7	15.910
30	Darawal, XXVIII	37	71 40 30.05	4.9322553	85557.0	16.204
	Sirwaia, XXIX	30	59 40 13.30	4.8391159	69042.4	13.076
	Parser, XXX	30	74 27 48.72	4.8868711	77067.5	14.596
31	Sirwaia, XXIX	30	45 51 57.98	4.7589892	57410.2	10.873
	Parser, XXX	33	47 55 31.62	4.7963020	62560.8	11.849
	Bulandpur (<i>Bulandpur</i>), XXXI	34	77 4 19.35	4.9145877	82146.3	15.558
32	Bulandpur, XXXI	33	55 0 9.03	4.8391159	69042.4	13.076
	Jarura, XXXII	37	68 2 30.29	4.9209844	83365.1	15.789
	Jarura, XXXII	37	67 51 3.77	4.9203988	83252.8	15.768
33	Bulandpur, XXXI	37	44 6 25.94	4.7963020	62560.8	11.849
	Jarura, XXXII	38	44 55 35.21	4.7950568	62381.6	11.815
	Dahlelnagar, XXV	38	64 23 0.19	4.9011956	79651.8	15.086
34	Jarura, XXXII	39	70 41 24.50	4.9209844	83365.1	15.789
	Dahlelnagar, XXV	33	65 10 33.05	4.8693168	74014.5	14.018
	Kokra, XXIII	33	64 55 16.82	4.8684193	73861.7	13.989
		33	49 54 10.13	4.7950568	62381.6	11.815

NOTE.—Stations Kokra, XXIII, and Dahlelnagar, XXV, appertain to the North-East Longitudinal Series.

October 1878.

J. B. N. HENNESSEY,

In charge of Computing Office.

AMUA MERIDIONAL SERIES. **SECONDARY TRIANGULATION. TRIANGLES.**

PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

No. of Triangle	Station	Corrected plane angle	Distance			No. of Triangle	Station	Corrected plane angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
35	Lakampura, XIX	h.s.	43 39 1	4'784372	60866	40	Maihar, I	0 1 40	4'767232	58510	11'081	Inch
	Maihar, I		46 7 19	4'803187	63561		Tindota		3'923602	8387	1'588	"
	Tindota		90 13 40	4'945359	88178		Sarda Fort		4'784372	60866	11'528	"
36	Maihar, I	h.s.	11 2 38	4'501547	31736	41	Maihar, I	26 0 19	4'968798	93067	17'626	"
	Tindota		10 30 40	4'480327	30222		Pátol		3'992433	9827	1'861	"
	Sunwári Fort			4'784372	60866		Maihar Palace		5'007748	101800	19'280	"
37	Lakampura, XIX	h.s.	69 13 28	5'035398	101800	42	Tindota	129 55 28	4'968798	93067	17'626	"
	Maihar, I		49 27 23	4'945359	108492		Pátol		4'708025	51053	9'669	"
	Pátol				88178		Maihar Palace		4'713208	51666	9'785	"
38	Tindota	h.s.	71 56 0	4'693807	49409	43	Amua, XVII	18 12 48	4'653605	45041	8'530	"
	Pátol		24 16 41	4'329782	21369		Maihar, I		5'024042	105692	20'017	"
	Jura Fort			4'713208	51666		Jarra Hill Mark		5'117315	131013	24'813	"
39	Lakampura, XIX	h.s.	46 3 7	4'767232	58510	44	Maihar, I	53 31 3	4'856488	71860	13'610	"
	Tindota		82 29 37	4'906180	80571		Dharkána, IV		4'653605	45041	8'530	"
	Sarda Fort			4'803188	63561		Jarra Hill Mark		4'948646	88848	16'827	"

NOTES.—1. Names followed by Roman numerals are those of Principal Stations. Stations Amua, XVII, and Lakampura, XIX, appertain to the Calcutta Longitudinal Series of the S. E. Quadrilateral.
 2. The values of the side are given in the same line with the opposite angle. * Base deduced by two sides and included angle.

SECONDARY TRIANGULATION. TRIANGLES.

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J. B. N. HENNESSEY,
In charge of Computing Office.

No. of triangle	Station	Corrected plane angle	Distance			No. of triangle	Station	Corrected plane angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
45	Amua, XVII Sarang, VI Dokhan Hill Mark	22 49 30 16 6 45	5'238636 5'093197 5'448183	173235 123936 280661	32'810 23'473 53'156	56	Dharkana, IV Dagri, V Dho Hill Mark	40 53 7 53 33 32	4'985846 5'075414 5'168598	96793 118964 147434	18'332 22'531 27'923	Inch 18 "
46	Tindota Patol Amarpatan Temple	34 56 47 70 21 23	4'486897 4'702846 4'713208	30683 50448 51666	5'811 9'555 9'785	57	Dharkana, IV Sarang, VI Dho Hill Mark	9 7 12 66 30 0	4'313053 5'075414 5'099192	20561 118964 125658	3'894 22'531 23'799	" " "
47	Amua, XVII Sarang, VI Murwari Hill Mark	19 30 15 17 16 35	5'194520 5'143665 5'448183	156502 139208 280661	29'641 26'365 53'156	58	Dagri, V Sarang, VI Jali Hill Mark	63 17 29 11 17 52	5'035458 4'376511 5'068556	108507 23796 117100	20'551 4'507 22'178	" " "
48	Amua, XVII Patra, II Kusla Hill Mark	28 57 12 36 25 10	5'110322 5'198951 5'383972	128921 158107 242087	24'417 29'944 45'850	59	Kartar, VII Sihonda, IX Umri Hill Mark	34 2 9 12 28 28	4'892762 4'479259 5'005434	78120 30148 101259	14'795 5'710 19'178	" " "
49	Tindota Patol Unchehra Temple	98 22 24 50 11 46	4'991329 4'881480 4'713208	98023 76117 51666	18'565 14'416 9'785	60	Sarang, VI Kartar, VII Umri Hill Mark	6 4 7 154 17 16	4'479259 5'092445 4'981661	30148 123722 95865	5'710 23'432 18'156	" " "
50	Tindota Patol Unchehra Palace	98 23 41 50 12 17	4'991678 4'881997 4'713208	98102 76192 51666	18'580 14'430 9'785	61	Kartar, VII Marpha, VIII Chandor Hill Temple	8 24 56 106 20 7	4'304378 5'121085 5'097132	20155 132155 125064	3'817 25'029 23'686	" " "
51	Maihar, I Tindota Shankargarh Fort	104 34 0 36 46 17	4'974494 4'765838 4'784372	94296 58323 60866	17'859 11'046 11'528	62	Sihonda, IX Pavia, X Banda Mark	76 11 16 26 39 33	5'131461 4'796143 5'133195	133351 62338 135892	25'635 11'844 25'737	" " "
52	Maihar, I Patra, II Lalpahar Hill Mark	53 50 25 30 24 8	5'051989 4'849122 5'142717	112717 70652 138905	21'348 13'381 26'308	63	Pavia, X Papendi, XI Banda Mark	27 14 5 84 39 26	4'793873 5'131461 5'100848	62212 135351 126138	11'783 25'635 23'890	" " "
53	Patra, II Potenda, III Lalpahar Hill Mark	31 34 8 52 57 15	4'868838 5'051989 5'147914	73933 112717 140577	14'002 21'348 26'624	64	Jajman, XVIII Rau, XX Cawnpore Church	61 33 43 17 6 11	4'850308 4'374637 4'897600	70845 23694 78995	13'418 4'487 14'961	" " "
54	Dharkana, IV Sarang, VI Dureha Hill Mark	73 13 54 12 46 26	5'081377 4'444845 5'099192	120608 27851 125658	22'842 5'275 23'799	65	Jajman, XVIII Cawnpore Church Savada	32 14 40 106 48 30	4'120760 4'210082 4'374637	13206 16221 23694	2'501 3'072 4'487	" " †
55	Dharkana, IV Sarang, VI Pauna, Hill Mark	21 8 26 103 41 23	4'742024 5'172413 5'099192	55211 148735 125658	10'457 28'170 23'799							

NOTE.—Station Amua, XVII, appertains to the Calcutta Longitudinal Series of the South-East Quadrilateral.
* Base deduced by two sides and included angle.
† Instrument not known.

November 1878.

AMUA MERIDIONAL SERIES.

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL,
PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
AMUA, XVII*	0 1 "	BARAULI, XXV	0 1 "	DAHLELNAGAR, XXV†	0 1 "
Dokhán Hill Mark	148 8 54	Etorá, XXIII	3 45 27.32	Jarúrá, XXXII	65 5 47.39
Murwári "	151 28 9	Asu, XXIV	71 6 26.46	Kokra, XXXIII†	130 1 4.54
Jarra "	199 38 57	Nimkár, XXVI	141 8 50.82	Bulandpur, XXXI	354 24 22.40
Kusla "	215 59 43	Fatehnagar, XXVII	179 8 17.92		
Maihar, I	217 51 44.80				
Lakampura, XIX*	260 4 20.44	BULANDPUR, XXXI		DARAWAL, XXVIII	
		Sirwaia, XXIX	6 38 13.87	Parser, XXX	184 29 23.94
Asu, XXIV		Parser, XXX	61 38 23.23	Sirwaia, XXIX	244 9 37.54
Nimkár, XXVI	180 51 27.76	Jarúrá, XXXII	129 29 27.37	Fatehnagar, XXVII	312 55 4.21
Barauli, XXV	251 1 1.66	Dahlelnagar, XXV†	174 25 2.96	Nimkár, XXVI	358 58 16.08
Etorá, XXIII	316 43 12.59				
Bakseria, XXII	357 24 44.08	DAGRI, V		DEWARAN, XVII	
		Jálí Hill Mark	10 36 13	Jáimau, XVIII	210 16 46.01
		Dharkána, IV	18 35 58.44	Máwa, XVI	269 19 0.13
		Dho Hill Mark	72 9 30	Jahánabad, XV	341 37 24.30
BAKSERIA, XXII		Sárang, VI	73 53 41.81		
Rau, XX	9 39 52.81	Kartár, VII	118 3 24.52	DHARKANA, IV	
Asu, XXIV	177 25 2.94	Marpha, VIII	181 9 45.30	Dureha Hill Mark	75 18 13
Etorá, XXIII	249 24 35.21	Potenda, III	314 6 45.97	Panna "	127 23 41
Jhalotar, XXI	320 10 41.19			Sárang, VI	148 32 6.85

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † Of the North-East Longitudinal Series.

AZIMUTHS OF STATIONS AND INTERSECTED POINTS.

15—L.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
DHAKANA, IV Dho Hill Mark Dágrí, V Potenda, III Mailhar, I Járma Hill Mark	56 5 4 4 44	KANAKHERA, XIII Papendi, XI Jahánabad, XV Jáfrabad, XIV Músapur, XII	13 15 14 13	MÁWA, XVI Jahánabad, XV Dewarsán, XVII Jáhmau, XVIII Namána, XIX Jáfrabad, XIV	16 17 18 19 16
ETORA, XXIII Jhalotar, XXI Bakseria, XXII Asu, XXIV Barauli, XXV	23 23 24 25	KARTAR, VII Umri Hill Mark Sihonda, IX Chandor Hill Temple Marpha, VIII Dágrí, V Sáráng, VI	59 9 61 8 7 7	MUSAPUR, XII Papendi, XI Kánákhera, XIII Jáfrabad, XIV Pavia, X	12 13 14 12
FATEHNAGAR, XXVII Nimkár, XXVI Daráwal, XXVIII Sirwaia, XXIX Barauli, XXV	27 28 29 27	KOKRA, XXIII+ Dablehnagar, XXV+ Jarúra, XXXII	34 34	NAMANA, XIX Máwa, XVI Jáhmau, XVIII Rau, XX Jhalotar, XXI	19 19 20 21
JAFRABAD, XIV Kánákhera, XIII Jahánabad, XV Máwa, XVI Músapur, XII	14 15 16 14	LAKANPURA, XIX* Amua, XVII* Sarda Fort Mailhar, I Tindota Pátol Patra, II	1 39 1 35 37 2	NIMKAR, XXVI Asu, XXIV Daráwal, XXVIII Fatehnagar, XXVII Barauli, XXV	26 28 27 26
JAHANABAD, XV Dewarsán, XVII Máwa, XVI Jáfrabad, XIV Kánákhera, XIII	17 16 15 15	MAIHAR, I Sarda Fort Amua, XVII* Járma Hill Mark Dharkána, IV Shankargarh Fort Potenda, III Lálpahar Hill Mark Patra, II Pátol Tindota Mailhar Palace Sunwari Fort Lakanpura, XIX*	40 1 43 4 51 3 52 2 37 35 41 36 1	PAPENDI, XI Sihonda, IX Bánda Mark Kánákhera, XIII Músapur, XII Pavia, X PARSER, XXX Daráwal, XXVIII Jarúra, XXXII Bulandpur, XXXI Sirwaia, XXIX	11 63 13 12 11 30 32 31 30
JAJMAU, XVIII Dewarsán, XVII Saváda Cawnpore Church Rau, XX Namána, XIX Máwa, XVI	18 65 64 20 19 18	MARPHA, VIII Dágrí, V Kartár, VII Sihonda, IX Chandor Hill Temple Pavia, X	8 8 9 61 10	PATOL h.s. Lakanpura, XIX* Jura Fort Mailhar Palace Mailhar, I Unchehra Temple Unchehra Palace Amarpátan Temple	37 38 41 37 49 50 46
JARURA, XXXII Kokra, XXIII+ Dablehnagar, XXV+ Bulandpur, XXXI Parser, XXX	34 33 32 32	MAIHAR, I Sarda Fort Amua, XVII* Járma Hill Mark Dharkána, IV Shankargarh Fort Potenda, III Lálpahar Hill Mark Patra, II Pátol Tindota Mailhar Palace Sunwari Fort Lakanpura, XIX*	40 1 43 4 51 3 52 2 37 35 41 36 1	PAPENDI, XI Sihonda, IX Bánda Mark Kánákhera, XIII Músapur, XII Pavia, X PARSER, XXX Daráwal, XXVIII Jarúra, XXXII Bulandpur, XXXI Sirwaia, XXIX	11 63 13 12 11 30 32 31 30
JHALOTAR, XXI Namána, XIX Rau, XX Bakseria, XXII Etora, XXIII	21 21 22 23	MAIHAR, I Sarda Fort Amua, XVII* Járma Hill Mark Dharkána, IV Shankargarh Fort Potenda, III Lálpahar Hill Mark Patra, II Pátol Tindota Mailhar Palace Sunwari Fort Lakanpura, XIX*	40 1 43 4 51 3 52 2 37 35 41 36 1	PAPENDI, XI Sihonda, IX Bánda Mark Kánákhera, XIII Músapur, XII Pavia, X PARSER, XXX Daráwal, XXVIII Jarúra, XXXII Bulandpur, XXXI Sirwaia, XXIX	11 63 13 12 11 30 32 31 30

† Of the North-East Longitudinal Series. * Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
PATRA, II Lakanpura, XIX* Maihara, I Kusla Hill Mark Lálpahár, II Potenda, III	54 40 11 17 90 39 7 59 101 38 18 121 3 16 152 37 23 34	RAU, XX Cawnpore Church Bakseria, XXII Jhalotar, XXI Namána, XIX	22 2 48 52 3	SIHONDA, IX Umri Hill Mark Banda Mark Papendi, XI Pavia, X Marpha, VIII	59 62 11 10 9
PAVIA, X Marpha, VIII Si Honda, IX Banda Mark Papendi, XI Músupur, XII	5 35 48 89 66 4 37 75 92 44 11 119 58 16 07 164 36 5 81	SARANG, VI Dokhán Hill Mark Murwári Panna Umri Kartár, VII Dágri, V Dho Hill Mark Jáli Dharkána, IV Dureha Hill Mark	10 10 62 11 12	SIRWALA, XXIX Darawal, XXVIII Parser, XXX Bulandpur, XXXI Fatehnagar, XXVII	29 30 31 29
POTENDA, III Lálpahár Hill Mark Maihara, I Dharkána, IV Dágri, V Patra, II	25 29 48 30 59 12 24 66 54 37 45 134 13 13 90 332 32 33 34	SAYADA, S. Cawnpore Church Jájmán, XVIII	53 3 4 5 3	TINDOTA h.s. Lakanpura, XIX* Sunwári Fort Sarda Fort Maihara Palace Maihara, I Unchehra Palace Unchehra Temple Shankargarh Fort Jura Fort Amarpátan Temple	35 36 39 42 35 50 49 51 38 46
RAU, XX Jájmán, XVIII	9 46 7 32	SIHONDA, IX Kartár, VII	20		

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

J. B. N. HENNESSEY,
In charge of Computing Office.

November 1878.

AMUA MERIDIONAL SERIES.

CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— λ stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically, H_s for the Height when found by spirit leveling, and h for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of λ and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c., secondary stations by the letters h.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated. For alterations of district and other boundaries and consequent transfer of stations from one district to another since date of survey, see Addendum following page 8—L.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Amarpátan Temple. (<i>Baghelkhand, Rewah State</i>)</p> <p>λ 24 18 41.6 L 81 0 53.1 No. 46</p> <p>Amúa, XVII. (<i>Maihar. Vide page 3—L.</i>)</p> <p>λ 23 59 56.24 L 80 31 44.44 H 2113 h 4 No. 1</p> <p>Asu, XXIV. (<i>Sandila. Vide page 6—L.</i>)</p> <p>λ 27 4 38.20 L 80 31 14.26 H 480 h 30 No. 24</p> <p>Badanpur s. (<i>Baghelkhand, Maihar State</i>) In village.</p> <p>λ 24 9 0.43 L 80 51 36.44 See Synoptical Vol. of the Calcutta Longl. Series.</p>	<p>Badanpur Temple, (<i>Baghelkhand, Maihar State</i>) Eastern.</p> <p>λ 24 9 44.1 L 80 52 17.7 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Bakseria, XXII. (<i>Lassiapur. Vide page 6—L.</i>)</p> <p>λ 26 50 52.91 L 80 31 55.84 H 430 h 15 No. 22</p> <p>Bánda Mark. (<i>Bánda</i>)</p> <p>λ 25 28 19.35 L 80 22 4.03 Nos. 62, 63</p> <p>Banjári Fort, (<i>Jubbulpore</i>) N. W. Angle.</p> <p>λ 23 59 15.2 L 80 39 21.0 See Synoptical Vol. of the Calcutta Longl. Series.</p>	<p>Barauli, XXV. (<i>Sandila. Vide page 6—L.</i>)</p> <p>λ 27 8 17.01 L 80 43 6.92 H 464 h 30 No. 25</p> <p>Bulandpur, XXXI. (<i>Khairabad. Vide page 7—L.</i>)</p> <p>λ 27 51 11.46 L 80 42 35.92 H 504 h 24 No. 31</p> <p>Cawnpore Church (Christ's), (<i>Cawnpore</i>) Centre of steeple.</p> <p>λ 26 28 16.6 L 80 23 45.0 No. 64</p> <p>Chandor Hill Temple. (<i>Bánda</i>)</p> <p>λ 25 10 21.9 L 80 44 31.9 No. 61</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Dágri, V. (Nagode. Vide page 4—L.)</p> <p>λ 24 51 5·38 L 80 44 7·31 H 1588 h 7 No. 5</p> <p>Dahlelnagar, XXV.* (Muhamdi. Vide page 8—L.)</p> <p>λ 28 4 16·46 L 80 41 9·41 H 512 h 28 No. 33</p> <p>Darawal, XXVIII. (Khairabad. Vide page 7—L.)</p> <p>λ 27 33 35·96 L 80 31 15·81 Hs 473·28† h 30 No. 28</p> <p>Deora Fort, (Jubbulpore) N.E. Bastion.</p> <p>λ 23 57 14·5 L 80 34 41·9 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Deora Fort, (Jubbulpore) S.W. Bastion.</p> <p>λ 23 57 13·2 L 80 34 40·3 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Dewarsán XVII. (Cawnpore. Vide page 5—L.)</p> <p>λ 26 15 52·89 L 80 20 41·64 H 439 h 7 No. 17</p> <p>Dharkána, IV. (Nagode. Vide page 4—L.)</p> <p>λ 24 28 0·81 L 80 35 38·29 H 1860 h 2 No. 4</p> <p>Dho Hill Mark. (Bundelkhand) On a peak of the Vindhyaçal range and about 3 miles S. of the small village of Bargari. It is denoted by a small platform with two centre mark-stones of which the lower is imbedded in the ground.</p> <p>λ 24 46 10·69 L 80 27 27·54 Nos. 56, 57</p>	<p>Dhobi Temple. (Jubbulpore)</p> <p>λ 24 2 47·9 L 80 56 9·2 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Dokhán Hill Mark. (Bundelkhand) On a double-peaked hill about 3 miles south of Murwári. The hill is said to derive its name from its having two mines viz., one of copper and the other of iron. The former is reported to have been closed about a century ago lest its riches should attract the cupidity of the neighbouring Rájas. It is denoted by a platform 2½ feet high having two mark-stones with circle and dot engraved on them, the upper is at the surface of the platform and the other at level of ground.</p> <p>λ 24 17 18·82 L 80 19 57·46 No. 45</p> <p>Dureha Hill Mark. (Bundelkhand-Baghelkhand) On the northern extremity of the Rája's Puhár and immediately above the small village of Dureha. It is marked by a centre stone which is surmounted by a conical heap of stones.</p> <p>λ 24 26 50·73 L 80 30 46·71 No. 54</p> <p>Etorá, XXIII. (Sandila. Vide page 6—L.)</p> <p>λ 26 54 17·85 L 80 42 5·44 H 429 h 18 No. 23</p> <p>Etwa Tiled Building. (Baghelkhand, Rewah State)</p> <p>λ 24 10 18 L 81 0 55 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Fatehnagar, XXVII. (Khairabad. Vide page 6—L.)</p> <p>λ 27 23 58·52 L 80 42 51·05 H 469 h 35 No. 27</p> <p>Ghunsí Masjid. (Kheri)</p> <p>λ 27 57 40·0 L 80 33 53·1</p> <p>Jáfrabad, XIV. (Fatehpur. Vide page 5—L.)</p> <p>λ 26 0 43·97 L 80 38 3·87 H 423 h 17 No. 14</p>	<p>Jahánabad, XV. (Fatehpur. Vide page 5—L.)</p> <p>λ 26 6 3·35 L 80 24 18·54 H 435 h Not forthcoming No. 15</p> <p>Jájman, XVIII. (Cawnpore. Vide page 5—L.)</p> <p>λ 26 25 51·52 L 80 27 9·98 Hs 461·67† h 8 No. 18</p> <p>Jalhotr, XXI. (Rasulábád. Vide page 6—L.)</p> <p>λ 26 41 37·85 L 80 40 30·88 H 440 h 15 No. 21</p> <p>Jáli Hill Mark. (Baghelkhand, Kothi State) On an isolated hill called Lehrára Puhár and about 2 miles N. of the small village of Jáli and 6 miles from Kothi. The mark is engraved on one of a mass of rocks forming the summit of the hill.</p> <p>λ 24 47 13·66 L 80 43 19·79 No. 58</p> <p>Járra Hill Mark. (Baghelkhand, Nagode State) On a small hill of the same name rising about 150 feet above the mass of Bundel flats. In its vicinity is the village of Tulaganu. It is marked by a platform 1 foot high with one centre stone.</p> <p>λ 24 16 22·29 L 80 38 8·56 Nos. 43, 44</p> <p>Jarúra, XXXII. (Muhamdi. Vide page 7—L.)</p> <p>λ 27 59 55·94 L 80 30 38·13 H 536 h 28 No. 32</p> <p>Jiwár h.s. (Jubbulpore)</p> <p>λ 23 56 29·15 L 80 37 21·40 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Jukehi h.s. (Bundelkhand-Baghelkhand)</p> <p>λ 24 0 11·03 L 80 27 36·81 See Synoptical Vol. of the Calcutta Longl. Series.</p>

* Of the North-East Longitudinal Series.

† Refers to the mark-stone imbedded at the level of the ground, over which the tower has been built.

‡ Refers to the mark-stone let into the upper surface of the platform.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Jura Fort, (<i>Baghelkhand, Maihar State</i>) Bastion.</p> <p>λ 24 15 24.4 L 80 55 31.8 No. 38</p> <p>Kánákhera, XIII. (<i>Bánda. Vide page 5—L.</i>)</p> <p>λ 25 51 20.95 L 80 27 58.79 H_s 415.62† h 12 No. 13</p> <p>Kanwára Fort, (<i>Jubbulpore</i>) N. W. angle.</p> <p>λ 23 55 19.9 L 80 29 18.8 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Káritalai Fort, (<i>Jubbulpore</i>) S. W. angle.</p> <p>λ 24 3 15.5 L 80 45 6.5 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Kartár, VII. (<i>Bánda. Vide page 4—L.</i>)</p> <p>λ 25 1 29.85 L 80 22 38.18 H 1123 h 0 No. 7</p> <p>Kokra, XXIII.* (<i>Muhamdi. Vide page 7—L.</i>)</p> <p>λ 28 12 7.34 L 80 30 35.80 H 519 h 26 No. 34</p> <p>Kusla Hill Mark. (<i>Baghelkhand, Nagode State</i>) On a high detached hill about 2 miles S. W. of the town of Unchehra and 6 miles N. of Maihar. It is marked by a platform about 7 feet high having two marks, the lower is engraved on the rock.</p> <p>λ 24 21 2.71 L 80 48 29.37 No. 48</p> <p>Lakanpúra, XIX. (<i>Maihar. Vide page 3—L.</i>)</p> <p>λ 24 2 49.92 L 80 49 51.67 H 1780 h 4 No. 1</p>	<p>Lálpahár Hill Mark. (<i>Baghelkhand</i>) On an isolated hill of that name, about 8 miles S. of the village of Bullanwára. The centre mark is engraved on the rock.</p> <p>λ 24 26 21.81 L 80 53 49.93 Nos. 52, 53</p> <p>Latágaon Tiled Building, (<i>Baghelkhand, Maihar State</i>) Southern.</p> <p>λ 24 5 51 L 80 53 14 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Maihar, I. (<i>Maihar. Vide page 8—L.</i>)</p> <p>λ 24 17 0.34 L 80 46 13.62 H 1983 h 2 No. 1</p> <p>Maihar Palace. (<i>Baghelkhand, Maihar State</i>)</p> <p>λ 24 16 6.6 L 80 47 42.2 Nos. 41, 42</p> <p>Murpha, VIII. (<i>Bánda. Vide page 4—L.</i>)</p> <p>λ 25 7 2.29 L 80 44 28.64 H 1240 h 5 No. 8</p> <p>Máwa, XVI. (<i>Cawnpore. Vide page 5—L.</i>)</p> <p>λ 26 16 0.74 L 80 33 47.94 H 440 h 24 No. 16</p> <p>Muhamdi Fort. (<i>Kheri</i>) Flag on the highest paka building in fort, N. W. side of the town.</p> <p>λ 27 57 16.7 L 80 14 56.3</p> <p>Murwári Hill Mark. (<i>Bundelkhand</i>) On a conical hill round the north and west of whose base extends a village of the same name. About 3 miles distant from the large village of Khonpa. It is marked by a platform about 2½ feet high having two mark-stones with circle and dot engraved on them, one at the surface of the platform, the other on a level with the surface of the hill.</p> <p>λ 24 20 7.53 L 80 19 45.46 No. 47</p>	<p>Músapur, XII. (<i>Fatehpur. Vide page 5—L.</i>)</p> <p>λ 25 46 34.62 L 80 40 47.38 H 406 h 23 No. 12</p> <p>Namána, XIX. (<i>Harha. Vide page 6—L.</i>)</p> <p>λ 26 28 10.63 L 80 38 49.28 H 449 h 18 No. 19</p> <p>Naugua h.s. (<i>Jubbulpore-Baghelkhand</i>)</p> <p>λ 24 4 56.25 L 80 57 34.88 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Nimkár, XXVI. (<i>Khairabad. Vide page 6—L.</i>)</p> <p>λ 27 21 8.09 L 80 31 30.85 H 486 h 30 No. 26</p> <p>Palwa Temple. (<i>Baghelkhand, Maihar State</i>)</p> <p>λ 24 1 22.9 L 80 29 4.2 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Panna Hill Mark. (<i>Bundelkhand</i>) On a hill immediately S. of the village of that name. The mark is on the top of a two storied shooting box built by the father of the present Rája (1834), the lower centre stone is sunk in the floor.</p> <p>λ 24 42 54.17 L 80 14 16.65 No. 55</p> <p>Paprendi, XI. (<i>Bánda. Vide page 5—L.</i>)</p> <p>λ 25 37 40.25 L 80 26 45.41 H_s † { 427.39 —3 h 10 No. 11</p>

* Of the North-East Longitudinal Series. † Refers to the lower mark-stone imbedded at summit of the building, over which the tower has been carried up to a height of 12 feet. ‡ The height 424.39 refers as nearly as can be ascertained to the surface described on page 5—L.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Parser, XXX. (Muhamdi. Vide page 7—L.)</p> <p>λ 27 46 16.81 L 80 32 22.98 H_s 484.70* h 24 No. 30</p> <p>Pátol h.s. (Baghelkhand, Rewah State)</p> <p>λ 24 14 47.17 L 81 4 24.19 No. 37</p> <p>Patra, II. (Rewah. Vide page 3—L.)</p> <p>λ 24 16 46.74 L 81 11 14.97 H 2249 h 2 No. 2</p> <p>Pavia, X. (Bánda. Vide page 4—L.)</p> <p>λ 25 27 17.39 L 80 46 39.44 H 481 h 18 No. 10</p> <p>Potenda, III. (Rewah. Vide page 4—L.)</p> <p>λ 24 37 23.04 L 80 59 34.36 H 993 h 2 No. 3</p> <p>Raipur Masjid, (Kheri) Highest minaret.</p> <p>λ 27 58 37.4 L 80 33 0.8</p> <p>Rau, XX. (Rasulábad. Vide page 6—L.)</p> <p>λ 26 38 42.61 L 80 29 37.44 H_s 429.42† h 16.5 No. 20</p>	<p>Shankargarh Fort, (Baghelkhand, Nagode State) Square building.</p> <p>λ 24 26 15.6 L 80 49 8.3 No. 51</p> <p>Sárang, VI. (Panna. Vide page 4—L.)</p> <p>λ 24 45 42.20 L 80 23 46.62 H 1692 h 3 No. 6</p> <p>Sarda Fort, (Baghelkhand, Maihar State) High bastion gateway.</p> <p>λ 24 15 38.7 L 80 45 57.1 Nos. 39, 40</p> <p>Saváda s. (Cawnpore)</p> <p>λ 26 26 8.13 L 80 24 12.47 No. 65</p> <p>Sihonda, IX. (Bánda. Vide page 4—L.)</p> <p>λ 25 18 9.78 L 80 24 5.73 H 849 h Not forthcoming No. 9</p> <p>Sháhjahánpur City. (Sháhjahánpur) Kalas of Daul Khan's Rauza, mausoleum in city.</p> <p>λ 27 52 59.3 L 79 57 16.5</p> <p>Sháhjahánpur, Collector's Office. (Sháhjahánpur) Most northern skylight of the Magistrate and Collector's office.</p> <p>λ 27 53 7.6 L 79 57 40.5</p> <p>Sháhjahánpur, House. (Sháhjahánpur) Skylight of Mr. Barnes' paka house.</p> <p>λ 27 53 36.0 L 79 58 15.3</p> <p>Sháhjahánpur, Koti. (Sháhjahánpur) Staircase of Hakim Mendi's two storied house.</p> <p>λ 27 53 53.6 L 79 58 12.4</p>	<p>Sháhjahánpur, Rauza. (Sháhjahánpur) Kalas of Bahádur Khán's Rauza.</p> <p>λ 27 52 59.4 L 79 57 17.9</p> <p>Sháhjahánpur, Rosa Factory. (Sháhjahánpur) Conductor of the steam engine chimney of Rosa Sugar Works and Distillery.</p> <p>λ 27 49 22.0 L 79 57 27.0</p> <p>Singondi Temple, (Jubbulpore) Black.</p> <p>λ 23 56 6.6 L 80 42 50.2 See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Sirwaia, XXIX. (Khairabad. Vide page 7—L.)</p> <p>λ 27 37 43.43 L 80 40 50.34 H_s 471.61* h 30 No. 29</p> <p>Sunwári Fort, (Baghelkhand, Maihar State) N.W. angle.</p> <p>λ 24 13 41.2 L 80 50 17.5 No. 36</p> <p>Tíndota h.s. (Baghelkhand, Maihar State)</p> <p>λ 24 11 52.83 L 80 55 39.37 No. 35</p> <p>Unchehra Palace. (Baghelkhand, Unchehra State)</p> <p>λ 24 22 57.1 L 80 49 8.2 No. 50</p> <p>Unchehra Temple. (Baghelkhand, Unchehra State)</p> <p>λ 24 22 56.6 L 80 49 8.8 No. 49</p> <p>Umri Hill Mark. (Bundelkhand, Charkhári State)</p> <p>λ 25 5 49.81 L 80 19 56.74 Nos. 59, 60</p>

* Refers to the mark-stone imbedded at the level of the ground, over which the tower has been built.

† Refers to the mark-stone imbedded at the level of the

November 1878.

J. B. N. HENNESSEY,
In charge of Computing Office.

KARARA MERIDIONAL SERIES.

KARARA MERIDIONAL SERIES.

INTRODUCTION.

The Karára Series is the fourth in order—reckoning eastwards from the Northern Section of the Great Arc—of the Meridional chains of triangles included in the North-East Quadrilateral. It emanates at the side Karára-Marwás of the Calcutta Longitudinal Series—in Baghelkhand, south of the river Son, (Soane)—and follows the meridian of Karára, $81^{\circ} 18'$, as closely as the nature of the country permitted. It spans a meridional distance of about 250 miles, and though commenced in the field season of 1837-38 was not brought to a close until 1844-45.

For the first 110 miles of its length, the Series is carried as a double chain of triangles traversing portions of the Districts of Allahabad, Banda and Fatchpur, and of the Native States of Rewah, Soháwal and Panna. The first 90 miles are situated on the Kaimúr range and the high land which, generally speaking, forms the southern watershed of the Gangetic plain between the meridians of 81° and 82° : the remaining 20 miles cross the lower end of the Doáb between the Jumna and the Ganges. The Series is thereafter continued as a chain formed for the most part of single triangles, through portions of the Districts of Rae Bareilly, Bara Banki, Sitapur and Partabgarh, in the Province of Oudh, and it terminates at the side Khánpur-Mási of the North-East Longitudinal Series, in the plains at the feet of the Himalayan Mountains.

In January 1838 Lieutenant Jones of the Bengal Engineers, who was then employed

Season 1837-38.

PERSONNEL.

Lieut. W. Jones, Bengal Engineers, 1st Asst.
Mr. J. Scully, 2nd Class Sub-Assistant.

on the measurement of the Sironj Base-Line, was directed by the Surveyor General to organize a small native establishment and make all other necessary preparations with a view to commencing the Karára Series before the close of the current field season. Owing to the paucity of officers available only one assistant could be attached to the party.

The party arrived at Karára on the 1st of March, when Lieutenant Jones and Mr. Scully immediately commenced selecting stations for the required triangulation. In those early days of the survey the opinion was generally held that the links composing a chain of principal triangles should be the fewest possible, and therefore that the sides of the triangles should not be less than 20 miles in length. This restriction, coupled with the prescribed

conditions for securing symmetry, hampered Lieutenant Jones greatly and materially retarded his progress. Thus, writing to the Surveyor General on the 18th May, he reports that "both the result of a minute examination of the ground as far as 60 miles to the north of Karára and the repeated failures I have met with in my attempts to procure good and "symmetrical triangles compel me to state that I do not expect to succeed in producing such "work as I could wish, and as I feel that you will expect from me". Of one side Kaimúr-Jaliádhār, the shortness of which—seventeen miles—seems to have been a source of considerable concern to him, he says "it was not adopted until I had used every endeavour "during six weeks to get a better one,—until I had myself visited every part of the range "that appeared to offer the remotest chance of success, and cleared much of the heavy jungle "which considerably increases the difficulty of finding two points on this range mutually "visible and yet sufficiently distant". Eventually these difficulties led him to recommend the extension of the "work to the northward by a double series or succession of polygons using short sides"; this was assented to by the Surveyor General as being "very feasible and proper". Five principal stations had been selected by the commencement of June, when the rainy season commenced and sickness broke out in the camp. Lieutenant Jones thereupon proceeded to recess quarters at Allahabad.

Lieutenant Jones marched out of Allahabad on the 1st October; but before he had

Season 1838-39.

PERSONNEL.

Lieut. W. Jones, Bengal Engineers, 1st Asst.
Mr. J. Scully, 1st Class Sub-Assistant.

fairly resumed work, the whole camp was seized with jungle fever which compelled him to return to Allahabad. Mr. Scully fell a victim to the disease, and died on the 18th November: Lieutenant Jones himself and the entire native establishment were reduced to such a state of prostration as to leave the Surveyor General no alternative but to suspend the operations, and direct Lieutenant Jones to proceed when sufficiently recovered to join him at Kaliána, where he might be suitably employed in learning the use of the Great Astronomical Circles which were employed on the Great Arc in obtaining determinations of latitude for geodetic requirements; one of these instruments was then being employed there, simultaneously with another at Kaliánpur, in determining the differential latitude, or arc of amplitude between the two stations.

At the commencement of the field season of 1839-40 Lieutenant Jones again proceeded to resume the Karára Series, with the aid of two assistants, Messrs. C. Lane and J. W. Rossenrode; but on the third march from the Head Quarters in Dehra Dún he was taken so seriously ill with jungle fever, that he had to abandon the undertaking, take sick leave, and eventually resign his appointment in the Survey Department.

During the recess of 1841 Captain R. Shortrede—of the Bombay Army—was appointed

Season 1841-42.

PERSONNEL.

Captain R. Shortrede, 2nd Bombay European
Regiment, 1st Assistant.
Babu Ramdial De, 3rd Class Sub-Assistant.
Mr. D. Kirwan, do. do.

to conduct the Series, and to organize an establishment for the resumption of the work from the point where it had been left by Lieutenant Jones three years previously. The party left the Head Quarters in Dehra Dún early in October; but, owing to various delays and mishaps, it did not reach the first station of operation, Jaliádhār, until the 8th of February, when

the most favorable season of the year for observing had already gone by, and the opportunity was thus lost for pushing the work across a malarious tract of country in which an outbreak of sickness might at any time compel the party to leave the field. The remainder of the month was spent in clearing hill summits of forest. The next month was for the most part spent at the station of Marwás, where Captain Shortrede hoped to commence the observations of the principal angles; but the haziness of the atmosphere rendered all the signals—both lamps and heliotropes—to be wholly invisible. Captain Shortrede therefore moved on to Karára, where the atmosphere proved to be even worse than at Marwás, so that no terrestrial angles could be observed. “On some days”, wrote Captain Shortrede, “I could scarcely see the hill at about two miles distance on which I had the referring-mark”. On one day the Marwás heliotrope was seen, but it was flaring and unsteady to such a degree that not a single satisfactory measure of the angle between it and the referring-mark could be got. A complete set of angles between a referring-mark and a circumpolar star was however measured here, in order to obtain a direct astronomical determination of the azimuth at Karára, to be employed as the fundamental azimuth of the Series in lieu of the value of azimuth which had been brought up from Sironj through the Calcutta Longitudinal Series. It consisted of two measures of the angle between the mark and the star on each of 12 ‘zeros’, or settings of the horizontal circle of the principal theodolite, Troughton and Simms’ 18-inch No. 1.* Complete sets of observations were taken at both elongations of the star, and very satisfactorily; but they form the sum total of the work of final observing which was accomplished during this season. They were concluded on the 8th of April, when Captain Shortrede proceeded to recess quarters at Allahabad, reporting that in the existing state of the weather and with a sick list continually increasing (he had already lost 7 men of his establishment, and had 20 others sick in hospital) he felt that it would be an unwarrantable exposure of human life to remain longer in the field, and that it was his duty to move for the recess season into Allahabad, where the sick might have a better chance of recovery.

In the following field season the party, strengthened by Mr. J. W. Armstrong—who

Season 1842-43.

PERSONNEL.

Captain R. Shortrede,	2nd Bombay European
Regiment, 1st Assistant.	
Mr. J. W. Armstrong,	1st Class Sub-Assistant.
Babu Rundial Do,	3rd do.
Mr. D. Kirwan,	do. do.

had acquired considerable experience in the principal triangulation, having been employed for some time on the Rangir Series—left Allahabad on the 15th of November 1842, and made such good progress that by the end of the field season all the stations south of the Jumna had been selected, and the principal observations had been completed

for a distance of about 65 miles from the side of origin.

But the general design of the triangulation as laid out by Captain Shortrede differed materially from what had originally been intended by Colonel Everest, in that it consisted of a continuous net-work of triangles in which mutual observations were taken between all stations—however far apart—that happened to be mutually visible, instead of forming a succession of simple polygonal figures in which the mutual observations were restricted to the

* For a description of this instrument see pages 61 to 64 of the Appendices to Vol. II, and for an account of its peculiarities see page 96, and Appendix No. 4 of the same volume.

stations lying contiguous to each other. Theoretically of course the net-work is the best, as it ties the triangulation together more thoroughly; but practically it is far the most troublesome and tedious, to execute originally, and to treat eventually in the course of the general reduction of the triangulation; it is moreover very variable in its influence, tending to strengthen some portions of the net-work much more than other portions. For these reasons it had been deliberately rejected by Colonel Everest in favour of the simpler system of successive independent geometrical figures, which had been introduced on all the other chains of triangles executed up to that time, and has since been uniformly adopted.

On the termination of the field season the party retired to recess quarters at Allahabad where it arrived on the 2nd of June.

Field operations were resumed on the 1st November, Captain Shortrede having mean-

Season 1843-44.

PERSONNEL.

Captain R. Shortrede,	2nd Bombay European
Regiment, 1st Assistant.	
Mr. J. W. Armstrong,	1st Class Sub-Assistant.
" D. Kirwan,	2nd " "
Babu Ramdial De,	3rd " "

while suggested that the triangulation should be extended over the plains to the north as a chain of single triangles, thus departing not only from his original net-work which had become quite impracticable, but from the simple polygonal form which might have been adopted. Captain

Waugh, who had then succeeded Colonel Everest as Surveyor General, directed that the polygonal system should be adhered to as far as practicable; but that if much progress had already been made in laying out the Series as a chain of single triangles, it would not be right to incur the expense and delay which the abandonment of work already performed would occasion; otherwise, as there was no special difficulty in carrying the polygonal system over the country in which the operations were being conducted, he particularly wished that that system should not be departed from.

The selection of stations for a principal triangulation over a perfectly level plain—more particularly when richly cultivated and covered with towns, villages and trees—is, however, an undertaking which requires considerable practical experience, so that surveyors who have been operating for years with great success in a hilly country, may find themselves completely baffled and unable to advance, when they enter on an extensive plain covered with obstacles to distant vision and wholly devoid of commanding eminences. Thus in the early days of this Survey some years elapsed before the most appropriate method of operating in such plains was fully elaborated, as will be seen on reference to Section 3 of Chapter II of Volume II which gives a historical sketch of the successive methods adopted for the selection of stations. Captain Shortrede and his assistants had not as yet become sufficiently acquainted with the proper methods of procedure, and thus the selection of stations and the clearing of the lines between them proceeded very slowly; thus, during this season only five new stations were selected and prepared, by the construction of a tower* at each, as points of observation, and of these stations two were afterwards rejected; the measurement of the principal angles was correspondingly retarded, observations being taken at three stations only, *viz.*, Lálapur, Bagála and Pabhosa.

* NOTE.—The average height of these five towers was 32 feet; the average time occupied in their construction was a month and twenty days; and their average cost 440 Rupees.

Captain Waugh, having called for copies of the angle books containing the observations of the last two seasons, found that Captain Shortrede had departed from the system of observing which had been introduced by Colonel Everest and was then generally practised in this Survey,* and of which it was a leading feature that two or more observations of every angle should be made at each zero-setting of the azimuthal circle, and the mean taken, the whole being recorded separately from the observations at the other zero-settings. Captain Shortrede took only one observation of an angle at each zero-setting, and he combined the pairs of single observations which were taken at 180° apart—with reversed faces—into one, as if both had been taken on a single zero. By this means his observations escaped criticism, as they were never repeated on the same divisions of the circle, and they became to all appearances much more accordant, having been combined together in a way that—as it so happened†—concealed a large portion of the instrumental error, which was obviously objectionable.

Captain Waugh moreover found that the reduction of the net-work of triangulation, which has already been mentioned, would require the simultaneous solution of about 200 equations of condition, the labour of which would be quite out of proportion to the value of the results; he therefore directed the exclusion of certain stations and the omission of all observations which were redundant, thereby reducing the principal triangulation of the Series to the form in which it now appears; all redundant stations were treated as secondaries.

In order to expedite the completion of the Series, Captain Waugh deputed a second

Season 1844-45.

PERSONNEL.

Southern Section.	{	Captain R. Shortrede, 2nd Bombay Euro-
		pean Regiment, 1st Assistant.
		Mr. J. W. Armstrong, 3rd Principal Sub-
Northern Section.	{	Assistant.
		Mr. D. Kirwan, 2nd Class Sub-Assistant.
		„ J. B. N. Hennessey, 3rd Class Sub-
Northern Section.	{	Assistant.
		Captain J. S. Du'Vernet, 2nd Madras Euro-
		pean Regiment, 1st Assistant.
Northern Section.	{	Mr. J. Mulheran, 1st Class Sub-Assistant.
		„ W. Glynn, 2nd „ „
		„ „ „ „

party, under Captain J. S. Du'Vernet, to operate at the northern end during the field season of 1844-45, commencing at a side of 'the North Connecting Series'—now known as the North-East Longitudinal Series—which had been established during the previous field season, in close proximity to the Karára meridian. He also directed the abandonment of polygonal figures and the adoption of single triangles, in both sections of the Series, "whereby the operations will be greatly accelerated, although this object will be only obtained at the sacrifice of some degree of

precision"; he enjoined however that the single triangles were to be laid out "with every attention to symmetry and elegance".

The direct distance between the parallel up to which the triangulation had been completed, and the side of the 'North Connecting Series' on which it was intended to close, was about 160 miles. In this distance about 25 miles had been already prepared in the southern section by the construction of tower stations, and opening the lines between them, during the previous field season. In the northern section however no preparations had been made; nevertheless Captain Du'Vernet succeeded in carrying his triangulation down to the side Sora-Janai, thus completing a chain of 15 triangles which extended over a

* For full particulars of this system see Section 2 of Chapter II, Volume II, and for a brief outline see Section 1 of Chapter II of Volume VII.

† For an explanation of this see page 96 and Appendix 4 of Volume II.

direct distance of about 90 miles in a single field season, and executing much more than half the amount of work which remained to be accomplished.

In the southern section matters did not at first progress equally satisfactorily. When the better part of the field season was over, Captain Shortrede's services were placed at the disposal of the Bombay Government for other duties, and the charge of the party was made over to Mr. J. W. Armstrong. He set to work with great vigour to complete this section by carrying it up to the side to which the northern section was being brought down by Captain Du'Vernet; and by dint of great perseverance, and continuing to operate in the field until the middle of July, long after the hot weather had set in, he succeeded not only in accomplishing the task which he had undertaken, but in revising some angles of which the previous measures were discordant and unsatisfactory, and in improving a group of single unsymmetrical triangles by converting it into a tetragon. He also observed an azimuth of verification at Pabhosa.

The 18-inch Theodolite by Troughton and Simms which had hitherto been used by Captain Shortrede, was replaced at the commencement of this season by an 18-inch Theodolite by Cary, which had originally been obtained from the Madras Observatory and is described at page 68 of the Appendices to Volume II. But this instrument being also deemed unsatisfactory was replaced, in the month of April, by Harris and Barrow's 15-inch Theodolite, which had given very satisfactory results in Mr. Armstrong's hands on the Rangir Series, and is described at page 72 of the Appendices to Volume II.

The measurement of the principal angles in the northern section was executed by Captain Du'Vernet, with Saiyad Mir Mohsin's 18-inch Theodolite, described at page 67 of the Appendices to Volume II.

By the completion of the Karára Series the circuit of triangles which is formed by the Northern Section of the Great Arc and the Karára Series, and the sections of the two longitudinal chains at their extremities by which the two meridional chains are connected together, was also completed. The values of the closing errors as derived from the calculations of that time—which however were only approximate and preliminary to the final reductions—were small in latitude and longitude, but so large in side and azimuth that Captain Waugh proceeded in person to the station of Sora, at the side of junction between the two sections of the series, and determined an azimuth of verification there, by astronomical observations with the theodolite used by Captain Du'Vernet. The results led him to the conclusion that the southern portion of the Karára Series was the more defective of the two. Still however he was of opinion that the closing errors were “evidently of an accumulative character, arising in fact from a want of minute precision in the instrumental means employed, and therefore only to be remedied by a revision of the work with superior means”. The errors however were insignificant from a geographical point of view, and would exercise no effect on the Indian Atlas; they were also too minute to influence local topographical and revenue survey operations. Thus the Surveyor General, though distressed by their magnitude, concluded that he would not be “justified in recommending a revision of the work, because an urgent necessity exists for extending the trigonometrical opera-

“tions over other parts of the country remaining to be triangulated”.

On the completion of the Simultaneous Reduction of the North-East Quadrilateral, it was found that the errors which had actually been dispersed over the Karára Series, between the origin Karára-Marwás and terminus Khánpur-Mási, were as follows:—

In side	{	Logarithm	...	...	...	+ 0.000,0508,7
		giving a ratio of about $7\frac{1}{2}$ inches per mile.				
„		Latitude	...	...	...	+ 0".826
„		Longitude	...	...	...	+ 0.047
„		Azimuth	...	...	...	— 7.833

The trigonometrical determinations of the heights of the stations of this Series above the mean sea level, have been corrected by connecting the stations, wherever possible, with the lines of spirit levels which have been executed of late years in the course of operations in the Trigonometrical and the Revenue branches of the Survey Department. A list of the stations which have been so connected will be found on page 55—*M*; a statement of the several sections into which the Series is divided, as well as the method of adjustment employed is detailed on page 39 of Part I of Volume VII. It will here suffice to state that the spirit levels show that occasional errors of a magnitude which reaches a maximum of 7.7 feet have been made in the trigonometrical determinations of differences of level between contiguous stations; but in the long run these errors have a tendency to cancel each other, the total error generated between the sides of origin and terminus being less than the maximum single error.

Secondary Triangulation.

In the southern portion of the Series the principal stations are all situated on hills, and here therefore the secondary triangulation consists of the measurement of angles at those stations to fix all the most prominent and important points visible from them, such as the temples in Rewah. The angles were measured with the 18-inch theodolite which was employed for the principal triangulation. Usually two angles only of each triangle were measured, the point itself being unvisited; but in a few instances the points are stations of the net-work of triangulation which was primarily designed by Captain Shortrede and afterwards converted into a chain of simple consecutive figures by the elimination of superfluous stations; in these instances the third angle also was measured with the 18-inch theodolite.

On entering the plains it became necessary to fix points in and around the important city of Allahabad, lying about 20 miles to the east of the Series. Observations were taken from the stations of Bagála (XII) and Singraur (XV), with the 18-inch theodolite, which fixed a station in the Fort and the steeple of the Church, and thus furnished a base around which a minor triangulation was executed—probably with a 12-inch theodolite—by Mr. Mulheran when residing in Allahabad during the recess of 1845. In the following field season a chain of secondary triangles was carried up the Ganges from Mirzapore to Allahabad—

as a part of the operations of the Gurwáni Series—and extended to Singraur (XV), by Mr. Glynn; a branch chain was carried by Mr. Mulheran from Allahabad to Bagála (XII), passing through and connecting with his triangulation of the preceding year; both chains were executed with 12-inch theodolites. These triangulations have been adjusted to fit between the finally determined position-values of the principal stations of the two series on which they rest; the portion including and lying to the west of Allahabad is now published as appertaining to the Karára Series, while that to the east has been allotted to the Gurwáni Series.

A few secondary points were fixed in the vicinity of the side Karra (XVI) to Pariáon (XVIII) by a ray-trace triangulation executed by Mr. Mulheran in 1845. In the same year a point in the town of Rae Bareli, and a few other secondary points, were fixed by ray-trace triangulations depending on the sides Sora (XXIV) to Janai (XXV), Thána (XXXVII) to Imlia (XXXVI), and the terminal side Khánpur to Mási, in connection with Captain Du'Vernet's operations.

In 1845 Mr. Glynn was deputed by Captain Du'Vernet to carry a series of triangles with a 12-inch theodolite, from the side Pesar (XXX) to Utíámau (XXXII) up to the city of Lucknow, in order to fix points of importance in and around that city. It was supplemented and extended a few months subsequently by Mr. Mulheran. The stations of the triangulation not having been permanently marked are not now forthcoming; consequently the usual data of the triangles are not given, but merely the latitudes and longitudes of the domes, buildings and other permanent marks of which the positions were determined*.

In season 1852-53 a chain of secondary triangles was carried up the Gogra River, in connection with the operations of the Huríláong Meridional Series; it crosses the terminal side of the Karára Series, and connects with the station of Mási, at the eastern extremity of that side. The details appertaining to stations No. 164 to 217 of this river triangulation are now published as a portion of the Karára Series. The angles were measured with a 12-inch theodolite by Mr. Belletty. This triangulation has been adjusted to fit exactly between the finally determined position-values of the station Mási and the station Orejhár, the latter being No. XXIV of the Gurwáni Series.

C. WOOD,

Surveyor 2nd Grade.

MUSSOOREE: }
May 1881. }

* One of these was the site of the transit telescope in the Royal Observatory, the astronomically determined position of which—as deduced by Lieut-Colonel Wilcox—was as follows:—

Latitude $26^{\circ} 51' 17''.8$, by observations with the mural circle in 1842.

Longitude $80^{\circ} 59' 11''.4$, by observations on moon culminating stars in 1841.

The corresponding trigonometrically deduced values are { Lat. $26^{\circ} 51' 12''.9$
Long. $80^{\circ} 58' 57''.6$

Thus the astronomical determination of latitude exceeds the trigonometrical by $4''.9$, which shows that—assuming both to be exact—the proximate local attractions to the south are more influential on the direction of the plumb line in Lucknow than the attraction of the distant Himalayan ranges to the north. The astronomical determination of longitude differs from the trigonometrical by less than $14''$; the latter rests on an astronomical determination at Madras which was made within a few years of the one at Lucknow—see Chapter XI of Vol. II—and is now known to be about $2' 30''$ in excess of the true longitude from Greenwich; thus it seems probable that the astronomical longitudes of Madras and Lucknow were both affected in a nearly equal degree by the errors of the then existing Lunar Tables.

KARARA MERIDIONAL SERIES.

1—M.

ALPHABETICAL LIST OF STATIONS.

Amoli	XXXIII.	Marwás	XXVI.
Asrafpúr	XXXVIII.	(of Calcutta Longitudinal Series).	
Bagála	XII.	Mhao	X.
Basantpúr	XXIX.	Munai	XXIII.
Burwa	V.	Nagdílúpúr	XIV.
Dádar	III.	Náru	IV.
Doñri	VII.	Pabhosa	XIII.
Horesa	XIX.	Parewa	XXVIII.
Imlía	XXXVI.	Pariáoñ	XVIII.
Jalíádhār	II.	Pesar	XXX.
Janai	XXV.	Ragaopúr	XXXV.
Kachár	IX.	Sálaon	XX.
Kaimúr	I.	Samnadío	XXXIV.
Karára	XXIII.	Singraor	XV.
(of Calcutta Longitudinal Series).		Sirmaol	VIII.
Karra	XVI.	Sora	XXIV.
Khánpúr	XXXIV.	Tángan	XXI.
(of North-East Longitudinal Series).		Taoli	XXVI.
Khára	XXII.	Thána	XXXVII.
Kotar Kaimári	VI.	Tikiri	XXVII.
Lálápúr	XI.	Turkani	XXXI.
Majilgáoñ	XVII.	Utíámáo	XXXII.
Mási	XXXV.		
(of North-East Longitudinal Series).			

KARARA MERIDIONAL SERIES.

NUMERICAL LIST OF STATIONS.

XXIII	.	.	.	Karára.	XX	.	.	.	Sálaon.
				(of Calcutta Longitudinal Series).					
XXVI	.	.	.	Marwás.	XXI	.	.	.	Tángan.
				(of Calcutta Longitudinal Series).					
I	.	.	.	Kaimúr.	XXII	.	.	.	Khára.
II	.	.	.	Jalíádhár.	XXIII	.	.	.	Munai.
III	.	.	.	Dádar.	XXIV	.	.	.	Sora.
IV	.	.	.	Náru.	XXV	.	.	.	Janai.
V	.	.	.	Burwa.	XXVI	.	.	.	Taoli.
VI	.	.	.	Kotar Kaimári.	XXVII	.	.	.	Tikiri.
VII	.	.	.	Doñri.	XXVIII	.	.	.	Parewa.
VIII	.	.	.	Sirmaol.	XXIX	.	.	.	Basantpúr.
IX	.	.	.	Kachár.	XXX	.	.	.	Pesar.
X	.	.	.	Mhao.	XXXI	.	.	.	Turkani.
XI	.	.	.	Lálápúr.	XXXII	.	.	.	Utíámáo.
XII	.	.	.	Bagála.	XXXIII	.	.	.	Amoli.
XIII	.	.	.	Pabhosa.	XXXIV	.	.	.	Samnadío.
XIV	.	.	.	Nagdílápúr.	XXXV	.	.	.	Ragaopúr.
XV	.	.	.	Singraor.	XXXVI	.	.	.	Imlíá.
XVI	.	.	.	Karra.	XXXVII	.	.	.	Thána.
XVII.	.	.	.	Majilgáoñ.	XXXVIII	.	.	.	Asrafpúr.
XVIII	.	.	.	Pariáoñ.	XXXIV	.	.	.	Khánpúr.
									(of North-East Longitudinal Series).
XIX	.	.	.	Horesa.	XXXV	.	.	.	Mási.
									(of North-East Longitudinal Series).

KARARA MERIDIONAL SERIES.

DESCRIPTION OF PRINCIPAL STATIONS.



Of the 38 Principal Stations composing this Series, the 13 southernmost, as also the 2 initial stations, are on hills, and consist generally of low solid platforms, each carrying a mark at its upper surface and having a corresponding mark below; in a few instances the station is denoted by a pile of stones, on which the usual mark of a circle and dot is fixed, or in the absence of any platform this mark is engraved on the rock *in situ*. When the Series entered on the plains, suitable artificial elevations had to be constructed, as usual, to admit of overlooking the curvature of the globe. At the first 10 stations, each of these structures consists of a basement 28 to 32 feet in diameter and 3 to 6 feet high, with a mark-stone fixed in its upper surface; this surface carries a masonry pillar, which in some instances is solid and includes at least one mark-stone and in others is perforated throughout its length: the pillar is either square or circular at base and 7 to 8 feet in width, terminating at top in a circle 4 feet in diameter; it is enclosed in a tower of unburnt bricks varying in diameter from 20 to 27 feet at base and from 16 to 21 feet at top: the tower is commonly faced with burnt brick as a protection against rain. At each of the remaining 15 stations of the Series as well as at the 2 terminal stations, the internal masonry pillar is without exception of the solid kind, while the external diameter of the tower varies from 17 to 22 feet at base and from 11 to 14 feet at top: the structure at one of these terminal stations, *viz.* Mási, underwent considerable alteration when revisited in course of the operations of the North-East Longitudinal Series.

The following descriptions have been compiled from those given in the original MS. General Report and other original records of this Series, supplemented in respect to the neighboring villages by information obtained from the Revenue and Topographical Survey maps of the country traversed. The information as to the local sub-divisions in which the several stations occur has been derived from the latest Annual Reports received from the District officers to whose charge the stations have been committed.

XXIII.—(*Of the Calcutta Longitudinal Series*). Karára Hill Station, lat. $24^{\circ} 5'$, long. $81^{\circ} 18'$ —observed at in 1827, 1842 and 1865—is situated on the highest point of a small range of hills running north-east and south-west, and is distant about 3 miles E.N.E. of the village of Karára; pargana Mádhogarh of the

Rewah territories.

The pillar is solid and contains two marks, the upper 3·0 feet above the lower, which is engraved on the rock *in situ*, having been placed there in 1827. The station was revisited in 1842 for the purpose of originating the Karára Meridional Series, but no alteration in its construction appears to have been made. On again visiting it in 1865, the upper mark was found displaced, and a new pillar carrying a mark-stone at summit in the normal of the old lower mark was then built to the same height as before. The distances and bearings of surrounding villages are:—Dal 1·6 miles W. by N.; Harai 1·8 miles E. by S.; and Mer 1·4 miles S.W.

XXVI.—(*Of the Calcutta Longitudinal Series*). Marwás Hill Station, lat. $24^{\circ} 5'$, long. $81^{\circ} 49'$ —observed at in 1827, 1828, 1842 and 1865—is situated on a range of hills running east and west about 2 miles S.S.W. of the town of Marwás; pargana Marwás of the Rewah territories.

The pillar is solid and contains two marks, the upper 3·6 feet above the lower which is engraved on the rock *in situ*, having been placed there in 1827. The station was revisited in 1842 for the purpose of originating the Karára Meridional Series, but no alteration appears to have been made in its construction. On again visiting it in 1865, the upper mark-stone was found undisturbed, and a new pillar was then built to the same height as before. The distances and bearings of neighboring villages are:—Amarha 0·9 mile N.W. by N.; and Sondia 2·2 miles N.E. by E.

I. Kaimúr Hill Station, lat. $24^{\circ} 17'$, long. $81^{\circ} 12'$ —observed at in 1843—is situated on the flat top of a hill so called, and is distant about half a mile S.W. of a tank; pargana Gurha of the Rewah territories.

The station consists of a pile of stones 6 feet high, and is marked as usual with a circle and dot. The distances and bearings of surrounding villages are:—Bagdhari 1·8 miles S.W. by S.; Chanin 2·2 miles N.W.; Bhitari 2·2 miles E.S.E.; and the hamlet of Hasthar 0·9 mile E. by N.

II. Jaliádhār (*Jaliádhār*) Hill Station, lat. $24^{\circ} 22'$, long. $81^{\circ} 27'$ —observed at in 1843—is situated on the summit of a long hill so called which is the highest in that part of the range; pargana Gurha of the Rewah territories.

No description of the construction of the station is forthcoming in the original records, but it may be assumed that it is marked by a structure somewhat similar either to that at Kaimúr or at Dádar. The distances and bearings of surrounding villages are:—Katra 2·7 miles W.N.W.; Mau 2·2 miles S.E.; and Bírpur 1·9 miles S. by E.

III. Dádar Hill Station, lat. $24^{\circ} 36'$, long. $81^{\circ} 15'$ —observed at in 1843—is situated on the summit of a small detached hill about $1\frac{1}{2}$ miles S. by W. of the village of Dádar; pargana Rewah of the Rewah territories.

The station consists of a platform which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Bankunia 0·2 mile E.S.E.; Sakaṛwar 1·4 miles W.; Murárpur or Marha 1·5 miles N.W.; and Banjára about $1\frac{1}{2}$ miles E.N.E.

IV. Náru Hill Station, lat. $24^{\circ} 30'$, long. $81^{\circ} 0'$ —observed at in 1843—is situated at the north-eastern extremity of a large flat-topped hill called Nárugarh on which there are some tanks and several springs of water, and whose summit is enclosed by a stone wall from 5 to 7 feet in height and 4 feet in thickness: in the Soháwal state.

No description of the construction of the station is forthcoming in the original records, but it may be assumed that it is marked by a structure somewhat similar either to that at Kaimúr or at Dádar. The distances and bearings of surrounding villages are:—Gurhuru 1·1 miles E.; Richari 1·6 miles N.; Kaitha 2·8 miles S.W.; and Beharra 2·2 miles S.S.E.

V. Burwa Hill Station, lat. $24^{\circ} 33'$, long. $81^{\circ} 31'$ —observed at in 1843—is situated on a detached hill about half a mile E. of Burwa: pargana Raipur of the Rewah territories.

The station consists of a pile of stones—the remains of a small Hindu temple—and is marked as usual with a circle and dot. The distances and bearings of surrounding villages are:—Buradi 0·8 mile S.S.W.; Barhái 1·1 miles N.; Gurgaon 2·2 miles E.; and the town of Raipur 2·6 miles N.W.

VI. Kotar Kaimári Hill Station, lat. $24^{\circ} 43'$, long. $81^{\circ} 3'$ —observed at in 1843—is situated on a block named Dongi at the western and highest part of the hill called Kaimári, and is distant somewhat more than 2 miles N.E. of the large village of Kotar: the block itself is held in much veneration in the neighbor-

hood, for tradition affirms that it is the spot from which the father of Rámchandra shot an arrow across a distance of 15 or 16 miles. Pargana Simurria of the Rewah territories.

The station is marked on a large block of laterite being the southern and lower of two blocks which project conspicuously. The distances and bearings of surrounding places are:—Kotar Kaimári hill fort 0·8 mile E. by N.; Bhamaun 1 mile N.; Umri 1 mile W.; and Abair 1·4 miles S.S.E.

VII. Donri (*Doñri*) Hill Station, lat. $24^{\circ} 54'$, long. $81^{\circ} 14'$ —observed at in 1843—is situated on the summit of a hill 1·3 miles N.N.E. of Donri village, and stands on the boundary between the Rewah and Panna territories; pargana Simurria of the Rewah territories.

The station consists of a square platform about 1 foot high, and is marked as usual with a circle and dot. The distances and bearings of surrounding villages are:—Kataik 2·5 miles S.W.; Mainaha 2·3 miles N. by W.; and Barua 1 mile N.N.E.

VIII. Sirmaul (*Sirmaol*) Hill Station, lat. $24^{\circ} 53'$, long. $81^{\circ} 26'$ —observed at in 1843—is situated on the highest part of the hill, and is distant about $3\frac{1}{4}$ miles N. by E. of the village of Sirmaul: pargana Sirmaul of the Rewah territories.

The station consists of a square platform about 2 feet high which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Itma 1·2 miles W.N.W.; Pathera 2·1 miles N. by E.; Luk 2·6 miles N.E.; and Bagha 2 miles S.

IX. Kachár Hill Station, lat. $24^{\circ} 57'$, long. $81^{\circ} 5'$ —observed at in 1843—is situated on the highest part of a hill so called, and is distant about 3 miles from Amua the residence of the Raja of Chaurasi. A stream in a rocky dell is about a mile to the S.E., and at 2 or 3 miles distance there is a waterfall which was formerly used as a place of Hindu pilgrimage: in the Panna state.

The station consists of a square platform about 1 foot high, and is marked as usual with a circle and dot. The distances and bearings of neighboring villages are:—Amama 3·4 miles S. by W.; Chutairi 3·5 miles S.W.; and Kulkaria 4·1 miles S.E.

X. Mau (*Mhao*) Hill Station, lat. $25^{\circ} 1'$, long. $81^{\circ} 18'$ —observed at in 1843—is situated on the highest part of the north-eastern knob of a hill, and is distant about 2 miles N.E. of Mau village: tahsil Mau, pargana Chhibu, district Banda.

The station consists of a square platform, and is marked as usual with a circle and dot. The distances and bearings of surrounding villages are:—Gurdari 1·4 miles N.W. by N.; and Uba 2·6 miles S.E.

XI. Lálapur (*Lálápúr*) Hill Station, lat. $25^{\circ} 14'$, long. $81^{\circ} 8'$ —observed at in 1844—is situated on the top of Valmík's *math* (a low temple) on an isolated hill, and is named after the village of Lálapur which lies close to its north-eastern foot: tahsil Karwi, pargana Tarhawan, district Banda.

The station mark is engraved at 3 inches to the west of the intersection of lines joining the corners of the walls—15 inches high—of the terrace the internal dimensions of which are 8 feet by 7 feet. The distances and bearings of surrounding villages are:—Bagrahi (on the left bank of the Ohan nadi) nearly 0·5 mile W.; Ajaura 0·4 mile N. by E.; Kairi Kutnassa 1 mile E. by N.; and Urwara 1 mile S.S.W.

XII. Bagála Hill Station, lat. $25^{\circ} 14'$, long. $81^{\circ} 39'$ —observed at in 1844—is situated on the highest part of a hill, and is named after the village of Bagála which lies at three quarters of a mile to the N.E.: thána, tahsil and pargana Bárah, district Allahabad.

The station is marked on the rock *in situ*. The distances and bearings of surrounding villages are:—Unturi 1·1 miles E.S.E.; Londh Kalán 1·4 miles E.N.E.; Burgarh 2·3 miles W.; and Baisa and Shiurájpur 1·2 and 2·3 miles, respectively, S. by E.

XIII. Pabhosa Hill Station, lat. $25^{\circ} 21'$, long. $81^{\circ} 22'$ —observed at in 1844—is situated on the ruins of an old temple at the highest part of a hill, elevated about 300 feet above the level of the Jumna (which flows at $\frac{1}{4}$ mile to the south) and remarkable from the circumstance of its being the only hill in the Doab; it is named after the village of Pabhosa which is distant 0·4 mile E.S.E.: thána Pachchhim Sará, tahsil Manjhanpur, pargana Atharban, district Allahabad.

The station is marked on a long block of stone imbedded in the mound. The distances and bearings of surrounding villages are:—Barēhri 1 mile W.; Amind 1·6 miles N. by E.; and Singwal 2·3 miles E. by N.

XIV. Nagdīlpur (*Nagdīlpūr*) Tower Station, lat. $25^{\circ} 34'$, long. $81^{\circ} 12'$ —observed at in 1845—is situated close to the west of the small village of Nagdīlpur: tahsīl Khakhruer, pargana Ekdala, district Fatehpur.

The station consists of a tower of unburnt bricks 33 feet high—with diameters at top and bottom, respectively, of 17 and 23 feet—enclosing a central hollow pillar of masonry 7 feet in diameter at bottom and 4 feet at top; the whole standing on a basement 31 feet in diameter and 6 feet high, having the central portion (diameter 8 feet) of masonry and carrying a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Kabra 0·4 mile W. by S.; Ratanpur 0·6 mile N.W.; and Bīrsinghpur 1 mile E.S.E.

XV. Singraur (*Singraor*) Tower Station, lat. $25^{\circ} 35'$, long. $81^{\circ} 41'$ —observed at in 1844—stands on the left bank of the Ganges, and is distant 0·6 mile S.S.W. of the village of Singraur: thāna and pargana Nawābganj, tahsīl Sorāon, district Allahabad.

The station consists of a tower of unburnt bricks 32 feet high—with diameters at top and bottom, respectively, of 16 and 23 feet—enclosing a central hollow core of masonry 7 feet in diameter at bottom and 4 feet at top; the whole standing on a basement 32 feet in diameter and 6 feet high, having the central portion (diameter 8 feet) of masonry and carrying a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Jhaupurwa 0·9 mile S.W.; Patna 1·2 miles N.W.; Mansūrabād 1·7 miles E. by N.; and Rāmngar 1·3 miles S.E.

XVI. Karra Tower Station, lat. $25^{\circ} 42'$, long. $81^{\circ} 25'$ —observed at in 1844 and 1845—is situated on the highest part of the old fort of Karra not far from the right bank of the Ganges which is depressed about 135 feet below it: tahsīl Sirāthu, thāna and pargana Karra, district Allahabad.

The station consists of a tower of burnt bricks 27 feet high—with diameters at top and bottom, respectively, of 21 and 27 feet—enclosing a central hollow pillar of masonry 7 feet in diameter at bottom and 4 feet at top; the whole standing on a basement 28 feet in diameter and $4\frac{1}{2}$ feet high, which carries a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Karra 0·3 mile N.E.; Kamālpur 0·9 mile N.W.; Sultānpur 0·7 mile S.W.; and Akbarpur 1·5 miles E.S.E.

XVII. Majilgaon (*Majilgāōñ*) Tower Station, lat. $25^{\circ} 45'$, long. $81^{\circ} 13'$ —observed at in 1845—is situated on a mound adjoining the western side of the village of Majilgaon and distant about half a mile N. of the Grand Trunk Road: tahsīl Khāga, pargana Hathgaon, district Fatehpur.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which other mark-stones have been fixed in the solid pillar at distances from it of 5, 10, 15, 20 and 25 feet. The distances and bearings of surrounding villages are:—Kathogan 1·9 miles W. by S.; Būdwan 1 mile N. by W.; Kurhaha 1·1 miles E.S.E.; and Purain 2·1 miles S. by E.

XVIII. Pariāon (*Pariāōñ*) Tower Station, lat. $25^{\circ} 50'$, long. $81^{\circ} 25'$ —observed at in 1845—is situated on a mound adjoining the village of Pariāon: thāna and tahsīl Kunda, pargana Mānikpur, district Partabgarh.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which other mark-stones have been fixed in the solid pillar at distances from it of 5, 10, 15, 20 and 25 feet. The distances and bearings of surrounding villages are:—Murussapur 1·2 miles S.S.W.; Gauri 0·8 mile N.W.; Kiraudi 1 mile N. by E.; and Sayyid Yasīmpur 1·4 miles S.E.

XIX. Horesa Tower Station, lat. $25^{\circ} 55'$, long. $81^{\circ} 17'$ —observed at in 1845—is situated on a mound adjoining the western side of the village of Horesa, and is distant about $1\frac{1}{4}$ miles E. of the left bank of the Ganges: thāna Jagatpur Tāngan, tahsīl, pargana and district Salon.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central hollow pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone to which access was had by means of a small arched passage. The distances and bearings of surrounding villages are:—Madāripur 0·3 mile S.W. by S.; Puchkura 1·1 miles N.N.E.; and Gangauli 0·6 mile S.E. by S.

XX. Salon (*Sálaon*) Tower Station, lat. $26^{\circ} 2'$, long. $81^{\circ} 30'$ —observed at in 1845—is situated near a temple standing on the highest part of the mound on which the town of Salon is built: thána, tahsíl, pargana and district Salon.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which a second mark-stone has been fixed on the summit of the solid pillar. The distances and bearings of surrounding villages are:—Saindhia 1 mile S.W.; Rájapur 1·1 miles N.W. by W.; Sanda Saidun 1·3 miles N.E.; and Aunasudra 1·1 miles E.

XXI. Tánghan (*Tárgan*) Tower Station, lat. $26^{\circ} 3'$, long. $81^{\circ} 19'$ —observed at in 1845—is situated on a mound adjoining the village of Tánghan: thána Jagatpur Tánghan, tahsíl Lalganj, pargana Dalmau, district Rae Bareli.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which other mark-stones have been fixed in the solid pillar at distances from it of 5, 10, 15, 20 and 25 feet. The distances and bearings of surrounding villages are:—Jingna 0·8 mile S.W.; Jagatpur 0·4 mile N.W.; Pura Bijai Kalán 0·8 mile E.; and Bairihar 0·8 mile S.S.E.

XXII. Khára Tower Station, lat. $26^{\circ} 8'$, long. $81^{\circ} 13'$ —observed at in 1845—is situated on a mound about 350 yards N.N.W. of the large village of Khára or Bela Khára: thána Jagatpúr Tánghan, tahsíl, pargana and district Rae Bareli.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which another mark-stone has been fixed in the summit of the solid pillar, others being fixed intermediately. The distances and bearings of surrounding villages are:—Jalálpur 0·4 mile N.W.; Habíb-ka-purwa 1 mile N.E. by E.; and Gaura Umarni 0·9 mile S.W.

XXIII. Munai Tower Station, lat. $26^{\circ} 11'$, long. $81^{\circ} 23'$ —observed at in 1845—is situated on a small mound about 300 yards S. by W. of the village of Munai: thána Mau, tahsíl, pargana and district Rae Bareli.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which other mark-stones have been fixed in the solid pillar at distances from it of 5, 10, 15, 20 and 25 feet. The distances and bearings of surrounding villages are:—Goyindwára 0·6 mile W. by S.; Nathuapur 1 mile E.N.E.; Banihapurwa 1·2 miles S.E.; and Sehi-ka-purwa 0·7 mile S.S.W.

XXIV. Sora Tower Station, lat. $26^{\circ} 17'$, long. $81^{\circ} 15'$ —observed at in 1845—is situated on an elevated mound distant about 500 yards S.S.W. of the village of Sora: thána, tahsíl, pargana and district Rae Bareli.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 16 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Tandu 0·5 mile S.E.; Majhgawan Ráo 1·3 miles W. by N.; Katkan-ka-purwa 0·8 mile N.; and Suranwán 1·4 miles E. by S.

XXV. Janai Tower Station, lat. $26^{\circ} 22'$, long. $81^{\circ} 24'$ —observed at in 1845—is situated on a mound distant 600 yards N.W. by N. of the village of Janai: thána and tahsíl Digbijaiganj, pargana Simrauta, district Rae Bareli.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 14, 20 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Chandapur 1·5 miles W.; Domapur 0·3 mile N.; Maharájpur 1·4 miles E. by S.; and Balipur 1·1 miles S.S.W.

XXVI. Tauli (*Taoli*) Tower Station, lat. $26^{\circ} 27'$, long. $81^{\circ} 15'$ —observed at in 1845—is situated on

high ground distant about half a mile N.W. of the village of Tauli: thána and tahsíl Digbijaiganj, pargana Inhauna, district Rae Bareli.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 9, 17, 24 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Pahnasa 1·3 miles W.S.W.; Unchauri 0·6 mile N. by W.; Puránaganj 1·1 miles E.; and Ghorauna 1·2 miles S.

XXVII. Tikiri Tower Station, lat. $26^{\circ} 33'$, long. $81^{\circ} 25'$ —observed at in 1845—is situated about 350 yards S.S.E. of the ruined village of Tikiri: thána Mohanganj, tahsíl Digbijaiganj, pargana Inhauna, district Rae Bareli.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 12 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 14, 20, 26 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Rámpur 1·3 miles W.; Sewapur 1·2 miles N.; Jaitpur 1·4 miles E.; and Kadupur 0·8 mile S.S.E.

XXVIII. Parewa Tower Station, lat. $26^{\circ} 38'$, long. $81^{\circ} 15'$ —observed at in 1845—is situated on low ground and is distant nearly 1 mile E. of the village of Parewa: district Bara Banki.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 10, 20 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Dahírapur 0·2 mile N.W.; Khaira Kunku 1·2 miles E. by S.; Sonbaba 0·8 mile S.S.E.; and Khajuria 0·6 mile S.W.

XXIX. Basantpur (*Basantpúr*) Tower Station, lat. $26^{\circ} 43'$, long. $81^{\circ} 25'$ —observed at in 1845—is situated on slightly elevated ground within a couple of hundred yards S.S.W. of the village of Basantpur: thána Zaidpur, tahsíl Haidargarh, pargana Siddhaur, district Bara Banki.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 14, 20 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Dandiya 0·8 mile W.; Simrawan 0·7 mile N.E. by N.; Díh Rámpur 0·7 mile E.S.E.; and Janipur 1 mile S.S.W.

XXX. Pesar Tower Station, lat. $26^{\circ} 49'$, long. $81^{\circ} 15'$ —observed at in 1845—is situated on elevated ground adjoining the village of Pesar, and is distant a few yards from the left bank of the Reth river: thána and tahsíl Nawabganj, pargana Satrikh, district Bara Banki.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 16 and 25 feet respectively above it. The distances and bearings of surrounding villages are:—Nagraura 1 mile W.; Gaiaspur 0·5 mile N.N.E.; Sarai Parsanda 0·6 mile S.E.; and Tehri 0·9 mile S.W. by S.

XXXI. Turkani Tower Station, lat. $26^{\circ} 55'$, long. $81^{\circ} 25'$ —observed at in 1845—is situated on high ground immediately west of the village of Turkani, and is distant 0·4 mile from the left bank of the Kalyáni river: thána Nawabganj, tahsíl Rám Sanéhi Ghat, pargana Daryabad, district Bara Banki.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 16, 20 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Khidrapur 0·7 mile S.E.; Safdarganj 1·6 miles W.; and Auliapur 1 mile N.

XXXII. Utíámau (*Utlámáo*) Tower Station, lat. $27^{\circ} 0'$, long. $81^{\circ} 15'$ —observed at in 1845—is situated on the ruins of the village of Utíámau, and is considerably elevated above the level of the surrounding plain: thána and tahsíl Nawabganj, pargana Dewa, district Bara Banki.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Shaikhpur 0·5 mile W.; Jíwanpur 0·6 mile N.; Ugeli 0·7 mile E.; and Kumurkha 0·5 mile S.E.

XXXIII. Amoli Tower Station, lat. $27^{\circ} 6'$, long. $81^{\circ} 24'$ —observed at in 1845—is situated in low ground, and is distant 0·7 mile S.W. of the village of Amoli Kalán: thána and pargana Rám Nagar, tahsíl Fatehpur, district Bara Banki.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 14, 20, 26 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Khilaura 0·6 mile W.; Manaura 1·3 miles N. by W.; Biknapur 0·9 mile E.S.E.; and Thal Khurd 0·5 mile S.

XXXIV. Samnadio (*Samnadio*) Tower Station, lat. $27^{\circ} 10'$, long. $81^{\circ} 14'$ —observed at in 1845—is situated on ground slightly elevated above the level of the surrounding country, and is at a short distance S.S.E. from the village of Samnadio or Samnadih: thána, tahsíl and pargana Fatehpur, district Bara Banki.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Kiratpur 0·2 mile S.W.; Rasulpur 0·7 mile N.; Dasrathpur 0·7 mile S.E.; and the town of Fatehpur 0·9 mile E. by N.

XXXV. Ragaupur (*Ragaopur*) Tower Station, lat. $27^{\circ} 18'$, long. $81^{\circ} 23'$ —observed at in 1845—is situated in the low-lying lands between the Chauka and Sarju rivers, and is distant about half a mile S.W. of the village of Ragaupur: thána and tahsíl Bári, pargana Kundri, district Sitapur.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 12 and 22 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8, 24 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Uchlapur 0·8 mile W.; Burwi Burwa 0·4 mile N.; Majh-gawán 0·7 mile E.; and Pura Shiughulám Singh 0·2 mile S.E. by S.

XXXVI. Imlia (*Imlia*) Tower Station, lat. $27^{\circ} 19'$, long. $81^{\circ} 10'$ —observed at in 1845—is situated at the S.W. angle of an old fort in the village of Imlia: tahsíl Bári, thána and pargana Mahmudabad, district Sitapur.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Ináyatpur 0·7 mile W.; Gobindpur 0·5 mile N.; Khwábipur 0·3 mile E.N.E.; and the town of Mahmudabad 2 miles S. by W.

XXXVII. Thána Tower Station, lat. $27^{\circ} 28'$, long. $81^{\circ} 17'$ —observed at in 1845—is situated on the S.W. bastion of the fort in the village of Thána, and is distant nearly a mile from the right bank of the Gogra river; thána Thánagaon, tahsíl Biswán, pargana Kundri, district Sitapur.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 12 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Chainpur 1·5 miles S.W. by S.; Wain 1·1 miles N. by W.; Thaura 1·4 miles N.E. by E.; and Dewaria 1·3 miles S.E.

XXXVIII. Ashrafpur (*Ashrafpur*) Tower Station, lat. $27^{\circ} 29'$, long. $81^{\circ} 4'$ —observed at in 1845—is situated on high ground adjoining the southern side of the village of Ashrafpur: thána, tahsíl and pargana Biswán, district Sitapur.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Pura Ashrafpur 0·4 mile W.; Ukbapur Khurd 1·3 miles E.N.E.; and Ramanbhari 0·2 mile S.E.

XXXIV.—(*Of the North-East Longitudinal Series*). Khánpur (*Khánpur*) Tower Station, lat. $27^{\circ} 39'$, long. $81^{\circ} 12'$ —observed at in 1844, 1845 and 1850—is situated in the centre on an old fortress within the village of Khánpur, and its site is elevated about 40 feet above the level of the surrounding country: thána Thánagaon, tahsíl Biswán, pargana Kundri, district Sitapur.

The station consists of an earthen tower 12 feet high—with diameters at top and bottom, respectively, of 13 and 17

feet—enclosing a central solid pillar of masonry having mark-stones at 6 and 12 feet respectively above the base. The station of 1844 was revisited in 1845 at the conclusion of the Karára Meridional Series, and was then apparently found in good preservation. It was again visited in 1850 in the course of the operations of the North-East Longitudinal Series; the mark-stone and pillar having been found intact, it was only necessary to repair the earthen tower. The distances and bearings of surrounding villages are:—Bidaura 1·4 miles S.W.; Mánpur 0·9 mile N.W.; Kunkari 1·5 miles E.; and Maururia Kalán 0·9 mile S. by W.

XXXV.—(*Of the North-East Longitudinal Series*). Mási Tower Station, lat. $27^{\circ} 38'$, long. $81^{\circ} 26'$ —observed at in 1844, 1845 and 1849—is situated in an old fort that stands in the centre of the village of Mási, and its site is elevated about 8 feet above the level of the annual inundation: thána and tahsíl Kurásar, par-gana Fakhrpur, district Bahraich.

The station consists of an earthen tower 24 feet high—with diameters at top and bottom, respectively, of 18 and 40 feet—enclosing a central solid pillar of masonry having mark-stones at 3, 8 and 24 feet respectively above the base. The station of 1844—which had the surrounding tower with diameters at top and bottom, respectively, of 11 and 18 feet—was revisited in 1845 at the conclusion of the Karára Meridional Series, and was then apparently found in good preservation. It was again visited in 1849 in the course of the operations of the North-East Longitudinal Series; the mark-stone at summit and the upper 4 or 5 feet of the central pillar which were then found removed were replaced and the surrounding tower extended to its present dimensions. The distances and bearings of surrounding villages are:—Shukulwa 0·9 mile S.W. by S.; Nasírpur 1·1 miles N.W.; Mansa, across the Sarju river, 1 mile E. by N.; and Bishanpur 0·9 mile S.S.E.

NOTE.—In a few instances, the names of principal stations, occurring in the foregoing descriptions, are given by two methods of spelling, distinguished from one another by the use of Roman and Italic type; as in XV. Singraur (*Singraor*): the latter spelling is taken from the Alphabetical and Numerical lists, which precede the descriptions and which were printed in 1869: the spelling in Roman type, is in accordance with the method authorized by the Government and illustrated in lists of Indian proper names published in 1874 and subsequently. It will be seen that the two methods differ but slightly; notwithstanding, where differences exist, both renderings are given, so as to remove all possible doubt as to the identity of a station. The method of spelling authorized by the Government, is hereafter exclusively adopted in the publication of this Series.

July 1877.

J. B. N. HENNESSEY,

In charge of Computing Office.

KARARA MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Condition of the Station
XXIII	...	Baghelkhand Agency	P. Mádhogarh	Devardah	...
XXVI	...	"	Marwás, Rewah State	Marwás	...
I	...	"	P. Gurha, Rewah State	Satar	The platform partly washed down, and 3 feet high, as reported in 1873.
II	...	"	Ditto.	Tikar	...
III	...	"	Rewah State	Bankari	...
IV	...	"	Soháwal State	Durjanpur	...
V	...	"	P. Raepur	Raepur	...
VI	Kotar	"	P. Semaria	Kotar	...
VII	...	"	Ditto.	Donri	...
VIII	Sirmaur	"	P. Sirmaur	Sirmaur	...
IX	...	...	...	...	No report received.
X	Garda-ka-Pahár	Bánda	P. Chhíbu	Sesa Sub Karra	...

NOTE.—Stations XXIII and XXVI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

P. stands for pargana.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Condition of the Station
XI	...	Bánda	P. Tarhawan	Lálapur	... ..
XII	Ghogar Minár	Allahabad	Thá. and Tah. Bárah, P. and Táluka Bagála	Ghogar	No mark found as reported in 1867.
XIII	..	"	Tah. Manjhanpur, P. Atharban, Thá. Pachchim Saríra	Pabhosa	Ditto.
XIV	Kabra Nagdalpur	Fatehpur	Tah. Khakhreru, P. Ekdala	Nagdalpur	Upper mark-stone missing as reported in 1867.
XV	...	Allahabad	Tah. Soraon, P. and Thá. Nawábganj	Singraur Khás	Considerable portion of the tower washed down by the rain as reported in 1874.
XVI	Kala Jaichand Minár	"	Tah. Siráthu, P. and Thá. Karra	Sawad Khat alias Karra	No mark-stone found as reported in 1867.
XVII	...	Fatehpur	Tah. Khajuha, P. Hathgaon	Majilgaon	Upper mark-stone missing as reported in 1867.
XVIII	...	Partabgarh	Tah. Kunda, P. Mánikpur, Thá. Sangrámgarh	Pariaun	... ..
XIX	...	Rae Bareli	Tah. and P. Salon, Thá Jagatpur	Horesa	... ..
XX	Salon	"	Tah., P. and Thá. Salon	Salon	... ..
XXI	Jagatpur Tánghan	"	Tah. Lalganj, P. Dalmau, Táluka Shankarpur	Tánghan	Mark-stone missing, and the pillar only 15 feet high, as reported in 1873 and 1874.
XXII	Bela Khára	"	Tah. and P. Rae Bareli, Táluka Khejurgaon, Thá. Jagatpur	Khára	... ..
XXIII	...	"	Tah., P. and Thá. Rae Bareli	Munai	... ..
XXIV	...	"	Tah., P. and Thá. Rae Bareli, Táluka Hardaspur	Sora	... ..
XXV	...	"	Tah. and Thá. Digbijai-ganj, P. Simrauta, Táluka Chandapur	Janai	... ..
XXVI	...	"	Tah. and Thá. Digbijai-ganj, P. Inhauna, Táluka Thulenda	Tauli	... ..
XXVII	Tikri	"	Tah. Digbijai-ganj, P. Inhauna, Thá. Mohan-ganj	Tikri	... ..
XXVIII	...	...	... ..	...	No report received.

NOTE.—P. stands for pargana, Tah. for tahsil, and Thá. for thána.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Condition of the Station
XXIX	...	Bara Banki	Tah. Haidargarh, P. Siddhaur, Thá. Zaidpur	Basantpur	... ..
XXX	Sarai Parsanda	„	Tah. and Thá. Nawáb- ganj, P. Satrikh	Sarai Parsanda	Entirely fallen down as reported in 1877.
XXXI	...	„	Tah. Rám Sanehi Ghát, P. Daryabad, Thá. Na- wábganj	Turkani	... ..
XXXII	Jianpur	„	Tah. Nawábganj, P. Dewa, Thá. Kursi	Jianpur	... ..
XXXIII	...	„	Tah. Fatehpur, P. and Thá. Rámnagar	Amoli	... ..
XXXIV	Samnadih	„	Tah., P. and Thá. Fateh- pur	Samnadih	... ..
XXXV	...	Sitapur	Tah. Bári, P. Kundri, Táluka Rámpur Mathu- ra, Thá. Thánagaon	Raghuapur	... ..
XXXVI	...	„	Tah. Bári, P. Mahmud- abad	Imlia	... ..
XXXVII	...	„	Tah. Biswán, P. Kundri, Thá. Thánagaon	Thánagaon	... ..
XXXVIII	...	„	Tah. and P. Biswán	Ashrafpur	... ..
XXXIV†	...	„	Tah. Biswán, P. Kundri, Thá. Tambaur	Khánpur	... ..
XXXV†	...	Bahraich	P. Fakhrpur, Thá. Sisía, Tah. Kurásar	Masi	... ..

NOTE.—Stations XXXIV† and XXXV† appertain to the North-East Longitudinal Series.

P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

September, 1882.

J. B. N. HENNESSEY,
In charge of Computing Office.

KARARA MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. TRIANGLES.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
1	Karára, XXIII	1'44	65 38 42'27	5'2116206	162787'3	30'831
	Marwás, XXVI	1'44	40 57 7'58	5'0686232	117117'9	22'181
	Jaliádhar, II	1'44	73 24 10'15	5'2336163	171244'4	32'433
2	Karára, XXIII	'58	49 8 29'30	4'9483767	88792'6	16'817
	Jaliádhar, II	'58	44 49 45'61	4'9178545	82766'5	15'676
	Kaimúr, I	'58	86 1 45'09	5'0686232	117117'9	22'181
3	Karára, XXIII	1'02	114 47 12'57	5'3408876	219223'7	41'520
	Marwás, XXVI	1'01	20 2 42'82	4'9178545	82766'5	15'675
	Kaimúr, I	1'02	45 10 4'61	5'2336163	171244'4	32'433
4	Kaimúr, I	'71	60 27 41'51	5'0281552	106697'7	20'208
	Jaliádhar, II	'72	73 9 2'57	5'0695674	117372'8	22'230
	Dádar, III	'71	46 23 15'92	4'9483767	88792'6	16'817
5	Jaliádhar, II	'51	59 23 7'51	4'9694424	93205'7	17'653
	Dádar, III	'51	40 29 14'56	4'8470672	70318'1	13'318
	Burwa, V	'51	80 7 37'93	5'0281552	106697'7	20'208

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Karára, XXIII, and Marwás, XXVI, appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
6	Dádar, III	"	°			
	Burwa, V	.83	69 37 0.63	5.0923326	123689.4	23.426
	Sirmaul, VIII	.83	65 26 36.42	5.0792423	120016.9	22.730
7	Dádar, III	.82	44 56 22.95	4.9694424	93205.7	17.653
	Sirmaul, VIII	.57	34 29 57.49	4.8357662	68511.9	12.976
	Donri, VII	.58	62 39 52.49	5.0312219	107453.8	20.351
8	Donri, VII	.58	82 50 10.02	5.0792423	120016.9	22.730
	Sirmaul, VIII	.23	63 21 37.03	4.8034301	63596.0	12.045
	Mau, X	.23	42 17 16.08	4.6800900	47872.9	9.067
9	Mau, X	.23	74 21 6.89	4.8357662	68511.9	12.976
	Bagála, XII	.70	72 57 3.20	5.1508909	141543.8	26.808
	Pabhosa, XIII	.71	81 36 34.62	5.1657352	146465.4	27.740
10	Mau, X	.70	25 26 22.18	4.8034301	63596.0	12.045
	Bagála, XII	1.01	46 21 47.52	5.0263431	106253.5	20.124
	Pabhosa, XIII	1.02	59 2 6.20	5.0999924	125890.3	23.843
11	Bagála, XII	1.02	74 36 6.28	5.1508909	141543.8	26.808
	Pabhosa, XIII	1.01	70 46 50.34	5.1341807	136201.1	25.796
	Singraur, XV	1.01	61 46 23.53	5.1041031	127087.6	24.070
12	Pabhosa, XIII	1.00	47 26 46.13	5.0263431	106253.5	20.124
	Singraur, XV	.95	44 31 54.37	4.9994105	99864.4	18.914
	Karra, XVI	.95	62 26 0.42	5.1011698	126232.1	23.908
13	Pabhosa, XIII	.96	73 2 5.21	5.1341807	136201.1	25.796
	Karra, XVI	.63	41 43 52.48	4.9244303	84029.2	15.915
	Nagdilpur, XIV	.63	48 51 19.13	4.9780166	95064.1	18.005
14	Kaimúr, I	.63	89 24 48.39	5.1011698	126232.1	23.908
	Dádar, III	.70	48 42 37.89	4.9600983	91221.7	17.277
	Náru, IV	.70	56 5 49.73	5.0033057	100764.1	19.084
15	Dádar, III	.70	75 11 32.38	5.0695674	117372.8	22.230
	Náru, IV	.49	59 4 34.03	4.9266980	84469.1	15.998
	Kotar Kaimári, VI	.48	53 2 20.68	4.8958580	78678.9	14.901
16	Dádar, III	.49	67 53 5.29	4.9600983	91221.7	17.277
	Kotar Kaimári, VI	.54	53 50 3.29	4.9448882	88082.2	16.682
	Donri, VII	.54	80 1 5.32	5.0312219	107453.8	20.351
17	Kotar Kaimári, VI	.54	46 8 51.39	4.8958580	78678.9	14.901
	Donri, VII	.31	33 39 38.15	4.6957877	49635.0	9.401
	Kachár, IX	.31	66 43 36.14	4.9152056	82263.2	15.580
18	Donri, VII	.32	79 36 45.71	4.9448882	88082.2	16.682
	Kachár, IX	.19	100 55 43.57	4.8762715	75209.3	14.244
	Mau, X	.18	38 40 51.98	4.6800900	47872.9	9.067
19	Kachár, IX	.18	40 23 24.45	4.6957877	49635.0	9.401
	Mau, X	.56	62 1 41.92	4.9913512	98028.2	18.566
	Lálapur, XI	.57	75 18 56.91	5.0308803	107369.3	20.335
20	Mau, X	.56	42 39 21.17	4.8762715	75209.3	14.244
	Lálapur, XI	.65	41 58 6.26	4.9258369	84301.8	15.966
	Pabhosa, XIII	.65	86 59 23.21	5.0999924	125890.3	23.843
		.65	51 2 30.53	4.9913512	98028.2	18.566

PRINCIPAL TRIANGULATION. TRIANGLES.

13—M.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
21	Lálapur, XI	·63	50 30 6'20	4'9780166	95064'1	18'005
	Pabhosa, XIII	·63	86 19 7'92	5'0897028	122942'7	23'285
	Nagdílpur, XIV	·63	43 10 45'88	4'9258369	84301'8	15'966
22	Nagdílpur, XIV	·34	49 48 44'38	4'8157810	65430'6	12'392
	Karra, XVI	·34	51 20 59'97	4'8253621	66890'1	12'669
	Majilgaon, XVII	·34	78 50 15'65	4'9244303	84029'2	15'915
23	Karra, XVI	·24	72 37 7'04	4'8399938	69182'1	13'103
	Majilgaon, XVII	·24	42 52 51'99	4'6931066	49329'5	9'343
	Pariáon, XVIII	·24	64 30 0'97	4'8157810	65430'6	12'392
24	Majilgaon, XVII	·25	45 17 14'52	4'7148617	51863'5	9'823
	Pariáon, XVIII	·25	63 16 49'45	4'8141667	65187'9	12'346
	Horesa, XIX	·25	71 25 56'03	4'8399938	69182'1	13'103
25	Pariáon, XVIII	·30	72 58 35'50	4'8933819	78231'5	14'817
	Horesa, XIX	·29	67 41 5'71	4'8790333	75689'1	14'335
	Salon, XX	·29	39 20 18'79	4'7148617	51863'5	9'823
26	Horesa, XIX	·21	47 45 56'23	4'7652079	58238'2	11'030
	Salon, XX	·21	36 16 6'58	4'6677467	46531'5	8'813
	Táughan, XXI	·21	95 57 57'19	4'8933819	78231'5	14'817
27	Salon, XX	·23	49 54 22'19	4'7235360	52909'8	10'021
	Táughan, XXI	·23	72 44 19'12	4'8198656	66048'9	12'509
	Munai, XXIII	·23	57 21 18'09	4'7652079	58238'2	11'030
28	Táughan, XXI	·18	72 35 36'54	4'7611466	57696'1	10'927
	Munai, XXIII	·17	46 21 21'25	4'6410274	43755'0	8'287
	Khára, XXII	·17	61 3 2'21	4'7235360	52909'8	10'021
29	Horesa, XIX	·14	29 36 18'61	4'6410274	43755'0	8'287
	Táughan, XXI	·14	118 42 6'39	4'8903472	77686'8	14'713
	Khára, XXII	·14	31 41 35'00	4'6677467	46531'5	8'813
30	Khára, XXII	·24	61 32 16'38	4'7767393	59805'3	11'327
	Munai, XXIII	·24	60 27 12'40	4'7721819	59181'0	11'209
	Sora, XXIV	·23	58 0 31'22	4'7611466	57696'1	10'927
31	Munai, XXIII	·25	53 0 31'77	4'7612666	57712'1	10'930
	Sora, XXIV	·26	71 7 41'60	4'8348711	68370'9	12'949
	Janai, XXV	·26	55 51 46'63	4'7767393	59805'3	11'327
32	Sora, XXIV	·23	57 2 58'55	4'7524861	56557'0	10'712
	Janai, XXV	·23	64 2 56'30	4'7824918	60602'7	11'478
	Tauli, XXVI	·23	58 54 5'15	4'7612666	57712'1	10'930
33	Janai, XXV	·25	61 16 49'47	4'7926892	62042'5	11'750
	Tauli, XXVI	·25	65 38 33'52	4'8092126	64448'5	12'206
	Tikiri, XXVII	·25	53 4 37'01	4'7524861	56557'0	10'712
34	Tauli, XXVI	·28	61 33 8'06	4'8143637	65217'4	12'352
	Tikiri, XXVII	·28	61 40 51'16	4'8148905	65296'6	12'367
	Parewa, XXVIII	·28	56 46 0'78	4'7926892	62042'5	11'750
35	Tikiri, XXVII	·28	59 44 27'48	4'8124049	64923'9	12'296
	Parewa, XXVIII	·29	60 4 15'97	4'8138551	65141'1	12'337
	Basantpur, XXIX	·29	60 11 16'55	4'8143637	65217'4	12'352

KARARA MERIDIONAL SERIES.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
36	Parewa, XXVIII	28	59 1 27'65	4'8062389	64008'7	12'123
	Basantpur, XXIX	29	60 33 29'37	4'8130084	65014'2	12'313
	Pesar, XXX	28	60 25 2'98	4'8124049	64923'9	12'296
37	Basantpur, XXIX	30	61 27 2'94	4'8323947	67982'1	12'875
	Pesar, XXX	31	62 45 2'40	4'8376115	68803'7	13'031
	Turkani, XXXI	30	55 47 54'66	4'8062389	64008'7	12'123
38	Pesar, XXX	30	57 44 57'23	4'8159682	65458'8	12'398
	Turkani, XXXI	30	60 48 36'91	4'8297601	67571'0	12'798
	Utiámau, XXXII	31	61 26 25'86	4'8323947	67982'1	12'875
39	Turkani, XXXI	27	54 22 24'81	4'7797749	60224'7	11'406
	Utiámau, XXXII	28	63 33 43'35	4'8217994	66343'7	12'565
	Amoli, XXXIII	28	62 3 51'84	4'8159682	65458'8	12'398
40	Utiámau, XXXII	24	58 20 42'58	4'7742597	59464'8	11'262
	Amoli, XXXIII	25	62 6 4'43	4'7905574	61738'7	11'693
	Samnadio, XXXIV	25	59 33 12'99	4'7797749	60224'7	11'406
41	Amoli, XXXIII	30	60 4 53'91	4'8289775	67449'3	12'774
	Samnadio, XXXIV	30	70 5 18'08	4'8643192	73167'7	13'858
	Ragaupur, XXXV	29	49 49 48'01	4'7742597	59464'8	11'262
42	Samnadio, XXXIV	30	67 49 20'70	4'8525750	71215'6	13'488
	Ragaupur, XXXV	29	50 53 22'59	4'7757791	59673'2	11'302
	Imlia, XXXVI	29	61 17 16'71	4'8289775	67449'3	12'774
43	Ragaupur, XXXV	33	55 37 48'60	4'8257795	66954'5	12'681
	Imlia, XXXVI	34	62 58 29'18	4'8588927	72259'1	13'685
	Thána, XXXVII	34	61 23 42'22	4'8525750	71215'6	13'488
44	Imlia, XXXVI	33	62 10 56'86	4'8472530	70348'2	13'324
	Thána, XXXVII	32	60 29 23'75	4'8402391	69221'2	13'110
	Ashrafpur, XXXVIII	32	57 19 39'39	4'8257795	66954'5	12'681
45	Thána, XXXVII	35	60 53 53'13	4'8529845	71282'8	13'501
	Ashrafpur, XXXVIII	34	59 31 33'79	4'8470310	70312'3	13'317
	Khánpur, XXXIV	34	59 34 33'08	4'8472530	70348'2	13'324
46	Thána, XXXVII	37	60 51 46'80	4'8709065	74285'9	14'069
	Khánpur, XXXIV	37	63 22 19'75	4'8809710	76027'6	14'399
	Mási, XXXV	37	55 45 53'45	4'8470310	70312'3	13'317

NOTE.—Stations Khánpur, XXXIV, and Mási, XXXV, appertain to the North-East Longitudinal Series.

November 1878.

J. B. N. HENNESSEY,

In charge of Computing Office.

KARARA MERIDIONAL SERIES.

SECONDARY TRIANGULATION. TRIANGLES.

PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
47	Karara, XXIII Jaliadhar, II Pabei	45 21 14	5.234039	171411	32.464	52	Jaliadhar, II Burwa, V Gurwa Parur	48 26 35	5.001658	100382	19.012	Inch 18
		105 33 39	5.365670	232097	43.958			99 56 37	5.121010	132133	25.025	"
		29 5 7	5.068623	117118	22.181			31 36 48	4.847067	70318	13.318	"
48	Marwas, XXVI Jaliadhar, II Pabei	79 2 13	5.234039	171411	32.464	53	Dadar, III Burwa, V Rawah Diwan's Temple	35 57 26	4.790603	61758	11.697	"
		32 9 27	4.968152	92929	17.600			26 26 23	4.670531	46831	8.869	"
		68 48 20	5.211621	162787	30.831				4.969442	93206	17.653	"
49	Dadar, III Kotar Kaimari, VI Andhi Hill Mark (heliotrope)	68 26 33	4.950061	80323	16.917	54	Dadar, III Burwa, V Rawah Large Temple	34 1 12	4.799745	63059	11.943	"
		56 33 1	4.903814	80133	15.177			21 46 3	4.621147	41797	7.916	"
			4.893858	78679	14.901				4.969442	93206	17.653	"
50	Kaimari, I Dadar, III Andhi Hill Mark (heliotrope)	43 3 24	4.903814	80133	15.177	55	Kotar Kaimari, VI Donri, VII Haraha Hill Mark (heliotrope)	60 10 29	4.886118	76934	14.571	"
		46 43 52	4.931788	83465	16.187			36 28 52	4.722019	52725	9.986	"
			5.069567	117373	22.230				4.944888	88682	16.682	"
51	Burwa, V Sirmaul, VIII Gurwa Parur	114 29 7	5.276138	188859	35.769	56	Donri, VII Kachar, IX Haraha Hill Mark (heliotrope)	30 14 44	4.625801	42247	8.001	"
		28 55 43	5.001658	100382	19.012			113 28 14	4.886118	76934	14.571	"
		36 35 10	5.092333	123689	23.426				4.695788	49635	9.401	"

NOTES.—1. Names followed by Roman numerals are those of Principal Stations. Stations Karara, XXIII, and Marwas, XXVI appertain to the Calcutta Longitudinal Series of the South-East Quadl.
2. The values of the side are given in the same line with the opposite angle.

KARARA MERIDIONAL SERIES.

Triangle No.	Station	Corrected Plane Angle	Distance			Triangle No.	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
57	Dádar, III Donri, VII Pati Hill Mark (heliotrope)	15 8 0 78 45 26	4.448975 5.023809 5.031222	28117 105635 107454	5.325 20.007 20.351	69	Bagála, XII Singraur, XV Allahabad Church	40 12 23 63 5 26	4.925830 5.066135 5.104103	84300 116449 127088	15.966 22.055 24.070	Inch 18 "
58	Dádar, III Kotar, Kaimári, VI Pati Hill Mark (heliotrope)	38 42 4 93 15 32	4.820571 5.023809 4.895858	66156 105635 78679	12.530 20.007 14.901	70	Bagála, XII Allahabad Fort Allahabad Church	5 33 38 107 56 2	4.074079 5.066135 5.050182	11860 116449 112249	2.246 22.055 21.259	" " "
59	Sirmaul, VIII Bagála, XII Raghumáthpur Hill Mark (helio.)	39 42 31 18 27 12	5.041972 4.736968 5.165735	110147 54572 146465	20.861 10.336 27.740	71	Allahabad Fort Allahabad Church Allahabad	26 13 0 98 37 58	3.724221 3.993189 4.074079	5299 9844 11860	1.004 1.864 2.246	" " "
60	Mau, X Bagála, XII Raghumáthpur Hill Mark (helio.)	50 51 6 43 53 35	5.041972 4.993312 5.150891	110147 98472 141544	20.861 18.650 26.808	72	Allahabad Church Allahabad Jhúsi	84 42 30 17 0 15	4.249044 4.256327 3.724221	17744 18044 5299	3.361 3.417 1.004	" " "
61	Sirmaul, VIII Mau, X Chaukandi Hill Mark	43 43 5 44 19 23	4.643231 4.647977 4.803430	43978 44461 63596	8.329 8.421 12.045	73	Allahabad Fort Allahabad Church Allahabad House No. 4	17 41 27 101 46 41	3.566024 4.023151 4.074079	3681 10548 11860	0.697 1.998 2.246	" " "
62	Bagála, XII Pabhosa, XIII Kohi Hill Mark (heliotrope)	27 24 19 129 56 54	5.103858 5.325417 5.026343	127016 211552 106253	24.056 40.067 20.124	74	Allahabad Fort Allahabad Allahabad House No. 4	8 31 33 110 33 43 60 54 44	3.222749 4.023151 3.993189	1670 10548 9844	0.316 1.998 1.864	" " "
63	Pabhosa, XIII Nagápur, XIV Kohi Hill Mark (heliotrope)	82 0 53 58 23 17	5.169382 5.103858 4.978017	147701 127016 95064	27.974 24.056 18.005	75	Allahabad Fort Allahabad House No. 4 Allahabad Juma Masjid	59 16 23 13 8 36	3.978234 3.400699 4.023151	9511 2516 10548	1.801 0.477 1.998	" " "
64	Kachár, IX Mau, X Bhauri Hill Mark (heliotrope)	68 8 27 68 31 19	5.007359 5.008507 4.876271	101709 101978 75209	19.263 19.314 14.244	76	Allahabad Fort Allahabad Allahabad Fort Flagstaff	113 22 50 7 56 14	4.024370 3.201736 3.993189	10577 1591 9844	2.003 0.301 1.864	" " "
65	Mau, X Pabhosa, XIII Bhauri Hill Mark (heliotrope)	48 45 45 52 25 32	4.984534 5.007359 5.099992	96501 101709 125890	18.277 19.263 23.843	77	Allahabad Fort Jhúsi Allahabad Fort Flagstaff	36 33 35 7 27 8	3.863796 3.201736 3.930663	7308 1591 8524	1.384 0.301 1.614	" " "
66	Mau, X Bagála, XII Chandaha Hill Mark (heliotrope)	12 46 0 40 54 34	4.589083 5.060879 5.150891	38822 115048 141544	7.353 21.789 26.808	78	Allahabad Fort Allahabad Allahabad Temple No. 2	7 18 18 124 3 37	3.222152 4.036097 3.993189	1668 10867 9844	0.316 2.058 1.864	" " "
67	Mau, X Pabhosa, XIII Chandaha Hill Mark (heliotrope)	33 35 49 64 43 24	4.847585 5.060879 5.099992	70402 115048 125890	13.334 21.789 23.843	79	Allahabad Fort Jhúsi Allahabad Temple No. 1	81 49 12 53 30 13	4.079203 3.988843 3.930663	12001 9746 8524	2.273 1.846 1.614	" " "
68	Bagála, XII Singraur, XV Allahabad Fort	45 46 1 58 45 36 75 28 23	ALLAHABAD SECONDARY SERIES.†			80	Allahabad Fort Allahabad Allahabad Temple No. 1	68 7 13 55 30 57	4.040300 3.988843 3.993189	10972 9746 9844	2.078 1.846 1.864	" " "
			45 46 1 58 45 36 75 28 23	94067 112249 127088	17.816 21.259 24.070	81	Allahabad Fort Allahabad Church Badra	74 31 23 43 12 49	4.222525 4.185556 4.074079	16693 15331 11860	3.161 2.904 2.246	" " "

† For the continuation of this triangulation see triangles No. 187 and following in the Synopsis of the Results of the Gurwani Meridional Series.

SECONDARY TRIANGULATION. TRIANGLES.

17—M.

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles	
82	Allahabad Fort Badra Jhúsi	49 12 2 33 28 11 97 19 47	4°06'217 3°93'0663 4°18'5556	11701 8524 15331	2°216 1°614 2°904	Inch * * *	95	Allahabad Fort Jhúsi Allahabad Burial Ground	162 25 15 6 34 28	4°12'9920 3°70'8663 3°93'0603	13487 5113 8524	2°554 0°968 1°614	"
83	Allahabad Fort Allahabad Church Jhúsi	123 43 25 33 8 22	4°25'6327 3°93'0663 4°07'4079	18044 8524 11860	3°417 1°614 2°246	* * *	96	Bagála, XII Allahabad Church Bhíta	21 50 4 133 0 44	4°77'2550 4°83'0526 5°06'6135	59231 67690 116449	11°218 12°820 22°055	12
84	Allahabad Fort Jhúsi Allahabad No. 2	76 38 36 58 25 28 44 55 56	4°06'9783 4°01'2106 3°93'0663	11743 10283 8524	2°224 1°948 1°614	* * *	97	Bagála, XII Bhíta Balaun Hill Mark	59 47 41 29 4 14	4°76'7240 4°51'7146 4°83'0526	58511 32896 67690	11°082 6°230 12°820	"
85	Jhúsi Allahabad No. 2 Allahabad No. 1 or Moia	43 30 11 79 21 29 57 8 20	3°98'3346 4°13'7975 4°06'9783	9624 13740 11743	1°823 2°602 2°224	* * *	98	Bhíta Balaun Hill Mark Usvar	39 15 34 94 9 14	4°56'9671 4°62'9567 4°76'7240	37125 42615 58511	7°031 8°071 11°082	"
86	Singraur, XV Allahabad Fort Allahabad, Begam's Mausoleum	5 16 35 23 58 47	4°24'7982 4°89'3349 4°97'3436	17700 78226 94067	3°352 14°815 17°816	18 * *	99	Bagála, XII Balaun Hill Mark Usvar	76 6 51 59 20 16	4°56'9671 4°42'8584 4°51'7146	37125 26828 32896	7°031 5°081 6°230	"
87	Allahabad Fort Badra Allahabad, Begam's Mausoleum	130 57 49 26 23 33	4°47'8113 4°24'7982 4°18'5556	30069 17700 15331	5°695 3°352 2°904	* * *	100	Bagála, XII Usvar Bárah	29 3 5 102 51 44 48 5 11	4°24'3195 4°54'5886 4°42'8584	17506 35147 26828	3°316 6°657 5°081	"
88	Allahabad Fort Jhúsi Jhúsi Temple	27 7 19 93 37 37	3°65'5315 3°99'5588 3°93'0663	4522 9899 8524	0°856 1°875 1°614	* * *	101	Bagála, XII Balaun Hill Mark Bárah	47 3 46 62 7 30	4°43'5279 4°54'5886 4°51'7146	27245 35147 32896	5°160 6°657 6°230	"
89	Allahabad Fort Badra Jhúsi Temple	22 4 43 31 8 36	3°85'6993 3°99'5588 4°18'5556	7194 9899 15331	1°363 1°875 2°904	* * *	102	Bagála, XII Bárah Maduria	70 45 52 29 14 24 79 59 44	4°52'7591 4°24'1377 4°54'5886	33697 17433 35147	6°382 3°302 6°657	"
90	Allahabad Fort Jhúsi Allahabad House No. 5	96 55 2 55 28 58	4°26'1631 4°18'0708 3°93'0663	18265 15100 8524	3°459 2°871 1°614	* * *	103	Bagála, XII Usvar Maduria	41 42 47 40 1 16	4°25'6202 4°24'1377 4°42'8584	18039 17433 26828	3°416 3°302 5°081	"
91	Allahabad Fort Badra Allahabad House No. 5	47 43 0 65 25 7	4°09'1097 4°18'0708 4°18'5556	12334 15100 15331	2°336 2°871 2°904	* * *	104	Bagála, XII Bhíta Ganges River No. 2	29 28 35 60 8 43 90 22 42	4°52'2558 4°76'8700 4°83'0526	33309 58708 67690	6°308 11°119 12°820	"
92	Allahabad Fort Jhúsi Ibrahimpur Idgáh	57 53 34 102 14 23	4°32'7292 4°38'9394 3°93'0663	21247 24513 8524	4°024 4°643 1°614	* * *	105	Bhíta Ganges River No. 2 Ganges River No. 4	37 54 32 62 36 2 79 29 26	4°31'8361 4°47'8230 4°52'2558	20814 30077 33309	3°942 5°696 6°308	"
93	Allahabad Fort Badra Ibrahimpur Idgáh	8 41 32 157 24 10	3°98'4121 4°38'9394 4°18'5556	9641 24513 15331	1°826 4°643 2°904	* * *	106	Bhíta Ganges River No. 4 Mámabhina	46 42 40 59 24 45 73 52 35	4°35'7733 4°43'0587 4°47'8230	22789 26952 30077	4°316 5°104 5°696	"
94	Allahabad Fort Jhúsi Araíl White Temple	47 6 45 38 26 2	3°70'6897 3°72'5495 3°93'0663	6265 5315 8524	1°86 1°007 1°614	* * *	107	Ganges River No. 4 Mámabhina Allahabad Church	59 8 22 84 52 50	4°52'2422 4°58'6987 4°35'7733	33298 38636 22789	6°306 7°317 4°316	"

* Instrument not known.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
108	Bagála, XII Maduria Bhita Temple	h.s. 56 17 14 109 23 8	4° 767908 4° 822327 4° 241377	58601 66455 17433	11° 099 12° 586 3° 302	121	Bagála, XII Maduria Tilapur W. Temple	h.s. 28 35 5 134 29 40	4° 457253 4° 630093 4° 241377	28658 42726 17433	5° 428 8° 092 3° 302	Inch 12 "
109	Bagála, XII Uswar Bhita Temple	h.s. 14 34 27 155 57 37	4° 613306 4° 822527 4° 428584	41049 66455 26828	7° 774 12° 586 5° 081	122	Bagála, XII Uswar Durgapur Temple	h.s. 55 14 27 84 30 16	4° 532863 4° 616225 4° 428584	34109 41326 26828	6° 460 7° 827 5° 081	" " "
110	Bagála, XII Uswar Bagála Hill Temple	h.s. 78 14 14 12 8 23	4° 419376 3° 751425 4° 428584	26265 5642 26828	4° 974 1° 069 5° 081	123	Bagála, XII Maduria Durgapur Temple	h.s. 13 31 40 156 58 31	4° 392968 4° 616225 4° 241377	24715 41326 17433	4° 681 7° 827 3° 302	" " "
111	Bagála, XII Maduria Bagála Hill Temple	h.s. 119 57 1 13 34 19	4° 318723 3° 751425 4° 241377	20832 5642 17433	3° 945 1° 069 3° 302	124	Singraur, XV Allahabad Church Tikri Gopálpur	" 33 59 10 121 53 16	4° 744285 4° 608333 4° 925830	55499 40582 84300	10° 511 7° 686 15° 966	" " "
112	Bagála, XII Bárah Parbajabad Hill Temple	s. 20 46 10 75 36 34	4° 098332 4° 534738 4° 545886	12541 34256 35147	2° 375 6° 488 6° 657	125	Singraur, XV Tikri Gopálpur Kandipur	" 27 45 18 116 54 41	4° 326209 4° 420291 4° 608333	21194 26320 40582	4° 014 4° 985 7° 686	" " "
113	Uswar Bárah Parbajabad Hill Temple	h.s. 42 13 46 27 31 23	4° 098332 3° 935638 4° 243195	12541 8623 17506	2° 375 1° 633 3° 316	126	Singraur, XV Tikri Gopálpur Haidarganj	" 35 27 18 136 7 10	3° 933411 4° 530977 4° 608333	8578 33961 40582	1° 625 6° 432 7° 686	" " "
114	Bagála, XII Maduria Bhúri Hill Temple	h.s. 78 17 26 50 46 37	4° 342156 4° 240418 4° 241377	21987 17395 17433	4° 164 3° 294 3° 302	127	Singraur, XV Kandipur Haidarganj	" 116 59 38 43 40 36	4° 100899 4° 530977 4° 420291	12615 33961 26320	2° 389 6° 432 4° 985	" " "
115	Bagála, XII Maduria Bagála House	h.s. 47 42 6 25 4 23	4° 130333 3° 888441 4° 241377	13500 7735 17433	2° 557 1° 465 3° 302	128	Singraur, XV Allahabad Church Ojaini	" 116 13 10	4° 854707 4° 361971 4° 925830	71566 23013 84300	13° 554 4° 359 15° 966	" " "
116	Bagála, XII Maduria Bobandar Zamindár's House	h.s. 58 55 52 69 38 0	4° 280973 4° 320186 4° 241377	19097 20902 17433	3° 617 3° 959 3° 302	129	Singraur, XV Kandipur Hatiadi	" 22 17 11 22 39 12	4° 150174 4° 156899 4° 420291	14131 14352 26320	2° 676 2° 718 4° 985	" " "
117	Bagála, XII Maduria Purkas Masjid	h.s. 53 33 28 100 41 10	4° 617941 4° 693755 4° 241377	41490 49403 17433	7° 858 9° 357 3° 302	130	Singraur, XV Ojaini Hatiadi	" 35 58 49 109 35 49	4° 140161 4° 156899 4° 361971	13809 14352 23013	2° 615 2° 718 4° 359	" " "
118	Bagála, XII Maduria Tilapur S.E. Temple	h.s. 26 49 54 133 35 38	4° 370825 4° 576178 4° 241377	23487 37686 17433	4° 448 7° 137 3° 302	131	Singraur, XV Tikri Gopálpur Ganges River No. 3	" 18 20 11 131 14 11	4° 401555 4° 780018 4° 608333	25209 60258 40582	4° 774 11° 413 7° 686	" " "
119	Bagála, XII Uswar Tilapur S. E. Temple	h.s. 68 32 41 69 36 4	4° 573115 4° 576178 4° 428584	37421 37686 26828	7° 087 7° 137 5° 081	132	Singraur, XV Allahabad Church Ganges River No. 3	" 15 38 59 132 36 29	4° 480922 4° 780018 4° 925830	30897 60258 84300	5° 852 11° 413 15° 966	" " "
120	Bagála, XII Uswar Tilapur W. Temple	h.s. 70 17 52 72 50 12	4° 624277 4° 630693 4° 428584	42100 42726 26828	7° 973 8° 002 5° 081	133	Allahabad Church Ganges River No. 3 Chapri	" 80 29 55 75 54 58	4° 105360 4° 497177 4° 489922	12746 31418 30897	2° 414 5° 950 5° 852	" " "

SECONDARY TRIANGULATION. TRIANGLES.

19—M.

Triangle No.	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	Inch
			Log. feet	Feet	Miles				Log. feet	Feet	Miles		
134	Tikri Gopálpur Ganges River No. 3 Chapri	28 12 57 82 32 12 69 14 51	4' 105360 4' 420992 4' 401555	8 12746 26730 25209	2' 414 5' 062 4' 774	147	Singraur, XV Kandpur Mubarakpur Flag	53 7 55 80 48 33	4' 466027 4' 557315 4' 420291	29243 36084 26320	5' 539 6' 834 4' 985	"	12
135	Allahabad Church Ganges River No. 3 Ditto. No. 5	97 8 25	4' 445883 4' 002333 4' 489922	27918 10215 30897	5' 287 1' 935 5' 852	148	Singraur, XV Tikri Gopálpur Sarai Flag	29 15 24 58 11 56	4' 297824 4' 538121 4' 008333	19853 34524 40582	3' 760 6' 539 7' 086	"	"
136	Chapri Ganges River No. 3 Ditto. No. 5	91 29 51 27 9 14	4' 445883 4' 389305 4' 105360	27918 24508 12746	5' 287 4' 642 2' 414	149	Tikri Gopálpur Ganges River No. 3 Sarai Flag	73 2 15 44 21 43	4' 433913 4' 297824 4' 401555	27159 19853 25209	5' 144 3' 760 4' 774	"	"
137	Allahabad Church Ganges River No. 3 Muhammadpur	61 31 32 69 33 3	4' 395466 4' 462194 4' 489922	24858 28986 30897	4' 708 5' 490 5' 852	150	Singraur, XV Ojaini Navabganj Flag	68 12 7	4' 510756 4' 595649 4' 361971	32416 32037 23013	6' 139 6' 068 4' 359	"	"
138	Allahabad Church Chapri Muhammadpur	87 29 0	4' 129002 4' 462194 4' 497177	13459 28986 31418	2' 549 5' 490 5' 950	151	Singraur, XV Tikri Gopálpur Navabganj Flag	54 20 46 49 54 58	4' 531781 4' 595649 4' 608333	34024 32037 40582	6' 444 6' 068 7' 086	"	"
139	Ganges River No. 3 Ditto. No. 5 Muhammadpur	60 18 19 77 19 9	4' 285259 4' 395466 4' 445883	19287 24858 27918	3' 653 4' 708 5' 287	152	Singraur, XV Haidarganj Koleha Dak Bungalow	83 5 14	3' 729643 4' 528120 4' 530977	5366 33738 33961	1' 016 6' 390 6' 432	"	"
140	Ganges River No. 5 Muhammadpur Aikpera	96 17 42 55 33 20	4' 366350 4' 042709 4' 285259	23246 11033 19287	4' 493 2' 090 3' 653	153	Singraur, XV Ojaini Korai Flag	8 33 41	4' 110418 4' 018688 4' 361971	12895 10440 23013	2' 442 1' 977 4' 359	"	"
141	Chapri Ganges River No. 5 Aikpera	63 8 37 90 6 0	4' 042709 4' 339739 4' 389305	11033 21864 24508	2' 090 4' 141 4' 642	154	Singraur, XV Haidarganj Korai Flag	7 33 49	4' 384371 4' 018688 4' 530977	24231 10440 33961	4' 589 1' 977 6' 432	"	"
142	Muhammadpur Allahabad Church Allahabad Pháphamau	50 33 18 91 48 42	4' 330160 4' 248172 4' 462194	22395 17708 28986	4' 242 3' 354 5' 490	155	Haidarganj Tikri Gopálpur Mufti-ka-purwa Flag	37 25 16	3' 804892 3' 718563 3' 933411	6381 5231 8578	1' 209 0' 991 1' 025	"	"
143	Chapri Allahabad Church Allahabad Pháphamau	43 12 16 73 49 26	4' 330160 4' 464492 4' 467177	22395 29140 31418	4' 242 5' 519 5' 950	156	Haidarganj Tikri Gopálpur Bhika Masjid	41 2 24 20 52 21	3' 805121 3' 539632 3' 933411	6384 3464 8578	1' 209 0' 656 1' 025	"	"
144	Ganges River No. 3 Allahabad Church Allahabad Pháphamau	37 6 21 56 20 14	4' 330160 4' 58850 4' 489922	22395 37055 30897	4' 242 7' 018 5' 852	157	Singraur, XV Ojaini Fatehpur Mat	130 34 26	4' 051821 4' 498660 4' 361971	11267 31525 23013	2' 134 5' 971 4' 359	"	"
145	Allahabad Pháphamau Allahabad Church Ganges River No. 6	57 23 55 60 45 23	4' 334908 4' 334678 4' 330160	21623 22630 22395	4' 095 4' 286 4' 242	158	Singraur, XV Ganges River No. 3 Fatehpur Mat	18 12 11 17 59 57	4' 503389 4' 498660 4' 780018	31870 31525 60258	6' 036 5' 971 11' 413	"	"
146	Singraur, XV Tikri Gopálpur Mubarakpur Flag	25 22 37 62 42 22	4' 240600 4' 557315 4' 008333	17402 36084 40582	3' 296 6' 834 7' 086	159	Singraur, XV Ojaini Ganipur Flag	19 50 23	4' 034577 4' 125254 4' 361971	16829 13343 23013	2' 051 2' 527 4' 359	"	"

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	Inch
			Log. feet	Feet	Miles				Log. feet	Feet	Miles		
160	Ojaini Hatiadi Ganges River No. 1	s. " "	19 13 6 23 9 15	6745 8057 13809	1' 277 1' 526 2' 615	170	Chapri Muhammadpur Nimba Paka Koti	s. " "	4' 302088 4' 068153 4' 129002	20049 11699 13459	3' 797 2' 216 2' 549	Theodolite used	12
161	Ojaini Hatiadi Alanchand Factory	s. " "	20 36 16 137 5 48	12807 24775 13809	2' 426 4' 692 2' 615	171	Chapri Ganges River No. 3 Nimba Paka Koti	s. " "	3' 900173 4' 068153 4' 105360	7946 11699 12746	1' 505 2' 216 2' 414	"	"
162	Singraur, XV Hatiadi Ganges River a	s.	43 27 45 34 34 22	10091 8325 14352	1' 911 1' 577 2' 718	172	Chapri Muhammadpur Man Masjid	s. " "	4' 233674 4' 232527 4' 129002	17127 17082 13459	3' 244 3' 235 2' 549	"	"
163	Ojaini Hatiadi Ganges River a	s. " "	41 2 1 75 1 27	10091 14849 13809	1' 911 2' 812 2' 615	173	Ganges River No. 3 Chapri Man Masjid	s. " "	4' 232527 4' 271738 4' 105360	17082 18606 12746	3' 235 3' 541 2' 414	"	"
164	Singraur, XV Hatiadi Ojaini Masjid	s.	31 25 51 115 7 54	13582 23579 14352	2' 572 4' 466 2' 718	174	Ganges River No. 3 Muhammadpur Rangpur Temple	s. " "	4' 369706 4' 022897 4' 395466	23426 41966 24858	4' 437 7' 948 4' 708	"	"
165	Kandipur Hatiadi Ojaini Masjid	s. " "	73 35 54 19 55 43	13582 4826 14131	2' 572 0' 914 2' 676	175	Ganges River No. 3 Chapri Rangpur Temple	s. " "	4' 540150 4' 022897 4' 105360	34686 41966 12746	6' 569 7' 948 2' 414	"	"
166	Singraur, XV Hatiadi Ojaini Mat	s.	32 27 20 111 28 54	13083 22686 14352	2' 478 4' 297 2' 718	176	Chapri Muhammadpur Rasulabad Ghat Temple	s. " "	4' 277112 4' 434412 4' 129002	18928 27190 13459	3' 585 5' 150 2' 549	"	"
167	Ganges River No. 3 Ditto. Chapri Masjid	s. " "	28 6 6	24632 13150 27918	4' 665 2' 491 5' 287	177	Muhammadpur Allahabad Phaphaman Rasulabad Ghat Temple	s. " "	3' 903079 4' 277112 4' 248172	8000 18928 17708	1' 515 3' 585 3' 554	"	"
168	Tikri Gopalpur Ganges River No. 3 Chapri Masjid	s. " "	29 7 30 81 57 50	13150 26733 25209	2' 491 5' 067 4' 774	178	Allahabad Phaphaman Ganges River No. 6 Allahabad Phaphaman Chimney	s. " "	4' 178267 4' 029530 4' 354678	15075 10704 22630	2' 855 2' 027 4' 286	"	"
169	Chapri Muhammadpur Begam Sarai	s. " "	17 33 33	28548 16233 13459	5' 407 3' 074 2' 549	179	Ganges River No. 3 Allahabad Phaphaman Ditto. Phaphaman Chimney	s. " "	4' 029530 4' 563548 4' 568850	10704 36006 37055	2' 027 6' 933 7' 018	"	"

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November 1879.

KARARA MERIDIONAL SERIES.

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL, PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
AIKPERA s. Chapri Muhammadpur Ganges River No. 5	124 52 5 159 24 45 214 58 5	141 140 140	ALLAHABAD HOUSE No. 4 s. Allahabad Allahabad Church Allahabad Fort Allahabad Juma Masjid	21 52 27 219 11 2 320 57 43 334 6 19	74 73 73 75
ALLAHABAD FORT s. Bagala, XII Allahabad Juma Masjid Allahabad Begam's Mausoleum Allahabad Burial Ground Allahabad Temple No. 2 Singraur, XV	50 43 39 81 41 51 102 13 15 119 57 51 125 8 23 126 12 2	68 75 86 95 78	ALLAHABAD No. 1 OR MOIA s. Allahabad No. 2 Jhúsi	123 19 45 180 28 5	85 85
Allahabad Allahabad House No. 4 Allahabad Church Allahabad House No. 5 Allahabad Temple No. 1 Ibrahimpur Idgáh	132 26 41 140 58 14 158 39 41 185 28 4 200 33 54 224 29 32	71 73 70 90 79	ALLAHABAD No. 2 s. Allahabad Fort Jhúsi Allahabad No. 1 or Moia	179 1 43 223 57 39 303 19 8	84 84 85
Allahabad Fort Flag Staff Jhúsi Temple Jhúsi Arail White Temple Allahabad No. 2	233 11 4 245 49 31 255 15 47 282 23 6 329 29 51 359 1 42	92 81 76 88 82 94 84	ALLAHABAD PHAPHAMAU s. Rasulabad Ghát Temple Ganges River No. 3 Chapri Muhammadpur Ganges River No. 6 Allahabad Phaphamau Chimney Allahabad Church	2 23 36 53 0 52 70 30 4 88 29 20 299 16 43 333 44 39 356 40 38	177 144 143 142 145 178 142
			ASTRAFPUR, XXXVIII Khánpur, XXXIV* Thána, XXXVII Imlia, XXXVI	215 35 46·83 275 7 20·96 332 27 0·67	45 44 44
			BADRA s. Jhúsi Jhúsi Temple	19 43 51 22 3 26	82 89

* Of the North-East Longitudinal Series.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
BADRA s. Allahabad Fort Allahabad Begam's Mausoleum Allahabad Church Allahabad House No. 5 Ibrahimpur Idgah	53 12 2 79 35 35 96 24 51 118 37 9 210 36 12	BHITA h.s. Uswar Ganges River No. 2 Ganges River No. 4 Allahabad Church Mámabina	81 87 81 91 93	GANGES RIVER No. 2 s. Bagála, XII Ganges River No. 4 Bhita GANGES RIVER No. 3 s. Tikri Gopálpur Fatehpur Mat Singraur, XV Sarai Flag Chapri Masjid Chapri Muhammadpur Allahabad Pháphaman Rangpur Temple Allahabad Pháphaman Chimney Ganges River No. 5 Man Masjid Nimba Paka Koti Allahabad Church	104 105 104 131 158 131 149 167 133 137 144 174 179 135 173 171 132
BAGALA, XII Raghunáthpur Hill Mark (hel.) Sirmaul, VIII Mau, X Kohi Hill Mark (heliotrope) Chandaha Hill Mark (heliotrope) Pabbosa, XIII Purkas Masjid Tilapur W. Temple Tilapur S.E. Temple Durgapur Temple Singraur, XV Maduria Ganges River No. 2 Allahabad Church Uswar Allahabad Fort Bagála House Parbajabad Hill Temple Bhita Temple Bhita Bobandar Zamindár's House Bárah Bhúri Hill Temple Balaun Hill Mark Bagála Hill Temple	11 8 17 29 35 28.82 55 1 51.70 86 39 40 95 56 26 114 3 58.92 135 17 52 160 16 15 162 1 26 175 19 40 184 50 50.27 188 51 20 s. 217 24 42 s. 225 3 13 h.s. 230 34 7 s. 230 36 51 236 33 26 238 51 2 245 8 34 h.s. 246 53 17 247 47 12 s. 259 37 12 267 8 46 306 40 58 308 48 21	BURWA, V Jaládhār, II Rewah Diwán's Temple Rewah Large Temple Dádar, III Sirmaul, VIII Gurwa Parur CHAPRI s. Ganges River No. 3 Begam Sarai Tikri Gopálpur Muhammadpur Allahabad Pháphaman Rangpur Temple Rasulabad Ghát Temple Ganges River No. 5 Man Masjid Allahabad Church Aikpera Nimba Paka Koti DADAR, III Kaimár, I Andhi Hill Mark (heliotrope) Náru, IV Kotar Kaimári, VI Pati Hill Mark (heliotrope) Donri, VII Sirmaul, VIII Burwa, V Rewah Large Temple Rewah Diwán's Temple Jaládhār, II	59 9 9 62 66 10 117 120 118 122 11 102 104 69 99 68 115 112 108 96 116 100 114 97 110	GANGES RIVER No. 6 s. Allahabad Church Allahabad Pháphaman Chimney Allahabad Pháphaman GURWA PARUR h.s. Jaládhār, II Burwa, V Sirmaul, VIII HAIDARGANJ s. Koleha Dák Bungalow Kandipur Korai Flag	145 178 145 52 51 51 152 127 154

AZIMUTHS OF STATIONS AND INTERSECTED POINTS.

23—M.

Name of station with azimuths of surrounding points	No. of triangling distance	Name of station with azimuths of surrounding points	No. of triangling distance	Name of station with azimuths of surrounding points	No. of triangling distance
HADARGANJ S. Singraur, XV Tikri Gopálpur Bhika Masjid Mufti-ka-purwa Flag	126 126 156 155	JHUSI S. Allahabad Fort Flagstaff Allahabad Allahabad Church Allahabad Temple No. 1 Allahabad House No. 5 Jhusi Temple Badra Ibrahimpur Idgáh	77 72 83 79 90 88 82 92	KHARA, XXII Sora, XXIV Munai, XXIII Tanghan, XXI Horesa, XIX	30 28 28 29
HATIADI S. Alamchand Factory Singraur, XV Ganges River a Ojaini Ojaini Mat. Ojaini Masjid Ganges River No. 1 Kandipur	161 129 162 130 166 164 160 129	KACHAR, IX Kotar Kaimari, VI Haraha Hill Mark (heliotrope) Bhauri Hill Mark (heliotrope) Lalapur, XI Mau, X Donri, VII	17 56 64 19 18 17	KOTAR KAIMARI, VI Náru, IV Haraha Hill Mark (heliotrope) Kachar, IX Pati Hill Mark (heliotrope) Donri, VII Dadar, III Andhi Hill Mark (heliotrope)	15 55 17 58 16 15 49
HORSA, XIX Majilgaon, XVII Khara, XXII Tanghan, XXI Salon, XX Pariáon, XVIII	24 29 26 25 24	KANDUPUR S. Hatiadi Singraur, XV Ojaini Masjid Mubarakpur Flag Tikri Gopálpur Haidarganj	14 50 4 2 3 2	LALAPUR, XI Kachar, IX Nagdiapur, XIV Pabhosa, XIII Mau, X	19 21 20 19
IMLIA, XXXVI Ashrafpur, XXXVIII Thána, XXXVII Ragaupur, XXXV Samnadio, XXXIV	44 43 42 42	KANDUPUR S. Hatiadi Singraur, XV Ojaini Masjid Mubarakpur Flag Tikri Gopálpur Haidarganj	129 125 165 147 125 127	MADURIA h.s. Bagála, XII Purkas Masjid Tilapur S. E. Temple Tilapur W. Temple Durgapur Temple Bhita Temple Uswar Bárah Bobandar Zamindár's House Bhúri Hill Temple Bagála House Bagála Hill Temple	102 117 118 121 123 108 103 102 116 114 115 111
JALADHAR, II Karara, XXIII* Kaimúr, I Dadar, III Burwa, V Gurwa Parúr Pabei Marwás, XXVI*	1 2 4 5 52 47 1	KARARA, XXIII* Kaimúr, I Jaládhar, II Pabei Marwás, XXVI*	2 1 47 1	MAJILGAON, XVII Nagdiapur, XIV Horesa, XIX Pariáon, XVIII Karra, XVI	22 24 28 22
JANAI, XXV Munai, XXIII Sora, XXIV Tauli, XXVI Tikini, XXVII	81 81 82 83	KARRA, XVI Pabhosa, XIII Nagdiapur, XIV Majilgaon, XVII Pariáon, XVIII Singraur, XV	12 13 22 23 12	MAMABHINA S. Bhita Ganges River No. 4 Allahabad Church	106 106 107
JHUSI S. Allahabad No. 1 or Moia Allahabad No. 2 Arail White Temple Allahabad Fort Allahabad Burial Ground	85 84 94 82 95	KHANPUR, XXXIV† Ashrafpur, XXXVIII Mási, XXXV† Thána, XXXVII	45 46 45	MARWÁS, XXVI* Karara, XXIII* Kaimúr, I Jaládhar, II Pabei	1 3 1 48

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † Of the North-East Longitudinal Series.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
MASI, XXXV* Thána, XXXVII Khampur, XXXIV*	46 46	OJAINI s. Alamchand Factory Ganges River No. 1 Hatiadi Korai Flag Singraur, XV Ganges River a Gaupur Flag Nawabganj Flag Allahabad Church Patehpur Mat	161 160 180 153 128 163 159 150 128 157	MAU, X Donri, VII Kachar, IX Bhauri Hill Mark (heliotrope) Lálapur, XI Pabhosa, XIII Chandaha Hill Mark (heliotrope) Bagála, XII Chaukandi Hill Mark Raghunáthpur Hill Mark (hel.) Sirmaul, VIII	8 18 64 19 10 66 9 61 60 8	RAGAUPUR, XXXV Sannadto, XXXIV Imlia, XXXVI Thána, XXXVII Amoli, XXXIII SALON, XX Paráion, XVIII Horesa, XIX Tanghan, XXI Munai, XXIII SANNADTO, XXXIV Imlia, XXXVI Ragaupur, XXXV Amoli, XXXIII Utiáman, XXXII	41 42 43 41 25 25 26 27 42 41 40 40
MUHAMMADPUR s. Nimba Pakakoti Ganges River No. 3 Bégam Saráí Chapri Rangpur Temple Allahabad Pháphaman Rasúlábád Ghát Temple Ganges River No. 5 Allahabad Church Alkpera Mau Masjid	170 187 169 188 174 142 176 189 187 140 172	PABHOSA, XIII Mau, X Lálapur, XI Bhauri Hill Mark (heliotrope) Kohi Hill Mark (heliotrope) Nagálpur, XIV Karra, XVI Singraur, XV Bagála, XII Chandaha Hill Mark (heliotrope)	10 20 65 62 18 12 11 10 67	MUNAI, XXIII Tanghan, XXI Khára, XXII Sora, XXIV Jana, XXV Salon, XX	27 28 30 31 27	SINGRAUR, XV Korai Flag Kandipur Bagála, XII Hatiadi Pabhosa, XIII Karra, XVI Nawabganj Flag Allahabad Church Allahabad Fort Sarai Flag Mubarakpur Flag Allahabad Bégam's Mausoleum Ganges River No. 3 Gaupur Flag Fatehpur Mat Tikri Gopálpur Ganges River a Haidarganj Ojaini Koleha Dák Bungalow Ojaini Mat Ojaini Masjid	153 125 11 129 11 12 150 69 68 148 146 86 131 159 157 124 162 126 128 152 166 164
NAGARPUR, XIV Lálapur, XI Kohi Hill Mark (heliotrope) Majilgaon, XVII Karra, XVI Pabhosa, XIII	21 63 22 13 18	PAREWA, XXVIII Pesar, XXX Basantpur, XXIX Tikri, XXVII Tauli, XXVI	36 35 34 34	NARU, IV Kotar Kaimári, VI Dádar, III Kaimúr, I	15 14 14	SIRMAUL, VIII Dádar, III Donri, VII Mau, X Chaukandi Hill Mark Bagála, XII Raghunáthpur Hill Mark (hel.) Gurwa Parúr Burwa, V	6 7 8 61 59 51 6

* Of the North-East Longitudinal Series. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

AZIMUTHS OF STATIONS AND INTERSECTED POINTS.

25—M.

Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance
SORA, XXIV Khara, XXII Tauli, XXVI Janai, XXV Munai, XXIII	8 51 12.08 182 39 59.99 239 42 58.77 310 50 40.63	TIKIRI, XXVII Janai, XXV Tauli, XXVI Parewa, XXVIII Basantpur, XXIX	33 33 34 35	TURKANI, XXXI Utiāmau, XXXII Amoli, XXXIII	38 39
TANGHAN, XXI Horesa, XIX Khara, XXII Munai, XXIII Salon, XX	12 46 18.61 131 28 25.14 204 4 1.86 276 48 21.21	TIKRI GOPALPUR S. Mufti-ka-purwa Flag Bhika Masjid Haidarganj Kandipur Singraur, XV Navābganj Flag Sarāi Flag Mubārakpur Flag Chapri Masjid Chapri Allahabad Church Ganges River No. 3	155 156 126 125 124 151 148 146 168 134 124 131	USWAR h.s. Bagāla Hill Temple Bagāla, XII Maduria Tilapur S. E. Temple Tilapur W. Temple Durgapur Temple Bhita Temple h.s. Parbajabad Hill Temple Bārah Balaun Hill Mark	110 99 103 119 120 122 109 98 113 100 98
TAULI, XXVI Sora, XXIV Parewa, XXVIII Tikiri, XXVII Janai, XXV	2 40 13.77 176 34 26.28 238 7 34.62 303 46 8.39	TURKANI, XXXI Basantpur, XXIX Pesar, XXX	37 37	UTAMA, XXXII Samnadio, XXXIV Amoli, XXXIII Turkani, XXXI Pesar, XXX	40 39 38 38
THANA, XXXVII Imlia, XXXVI Ashrafpur, XXXVIII Khānpur, XXXIV* Māsi, XXXV* Ragaupur, XXXV	34 43 55.83 95 13 19.90 156 7 13.38 216 59 0.55 333 20 13.27				

* Of the North-East Longitudinal Series.

 J. B. N. HENNESSEY,
In charge of Computing Office.

November 1879.

KARARA MERIDIONAL SERIES.

CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— λ stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically, H_s for the Height when found by spirit leveling, and h for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of λ and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c.; secondary stations by the letters h.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Aikpera s. (Allahabad) In field W. of the village. " " " λ 25 27 44.56 L 81 52 14.48 Nos. 140, 141	Allahabad, Berrill's Hotel. (Allahabad) " " " λ 25 25 49 L 81 54 21	Allahabad, Fort Flagstaff. (Allahabad) " " " λ 25 26 0.3 L 81 55 15.6 Nos. 76, 77
Alamchand Factory, (Allahabad) Chimney. λ 25 33 1.0 L 81 37 42.7 No. 161	Allahabad, Bhim's Lát, (Allahabad) Column, in fort. λ 25 25 51.5 L 81 55 3.8	Allahabad Fort s. (Allahabad) On main gate of fort. λ 25 25 53.87 L 81 54 59.76 No. 68
Aliganj Temple. (Lucknow) λ 26 55 46.6 L 81 0 33.2	Allahabad, Burial Ground, (Allahabad) Colonel Humphrey's Tomb. λ 25 26 19.2 L 81 54 11.4 No. 95	Allahabad, House No. 1. (Allahabad) Flag on Treasurer's house in Dáraganj. λ 25 26 52 L 81 55 36
Allahabad, Begam's House. (Allahabad) λ 25 26 37 L 81 53 33	Allahabad Church, (Allahabad) Steeple. λ 25 27 43.3 L 81 54 12.7 Nos. 69, 70, 107	Allahabad, House No. 2. (Allahabad) Staircase of Gosáin's house in Kyd-ganj. λ 25 25 47.3 L 81 54 3.1
Allahabad, Begam's Mausoleum. (Allahabad) In Khuro Bág. λ 25 26 31.0 L 81 51 51.0 Nos. 86, 87	Allahabad, Dáraganj, S.E. Temple. (Allahabad) λ 25 26 27.8 L 81 55 33.5	Allahabad, House No. 3. (Allahabad) E. chimney of Mr. Lang's house. λ 25 27 53.5 L 81 54 6.3

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<p>Allahabad, House No. 4 s. (Allahabad) On Mr. Lowther's house in Colonel-ganj.</p> <p>λ 25 27 15.03 L 81 53 47.29 Nos. 73, 74</p>	<p>Allahabad No. 1, or Moia s. (Allahabad) About 0.6 of a mile N.W. of village of the same name.</p> <p>λ 25 23 19.65 L 81 56 29.36 No. 85</p>	<p>Amoli, XXXIII. (Vide page 9—M.)</p> <p>λ 27 5 40.72 L 81 23 48.91 H 420 h 30 No. 39</p>
<p>Allahabad, House No. 5. (Allahabad) E. chimney of Mr. Montgomery's house.</p> <p>λ 25 28 23.4 L 81 55 15.5 Nos. 90, 91</p>	<p>Allahabad No. 2 s. (Allahabad) Close to Pura Fateh village, about 1 mile S. of Arail, the same distance N. of Daudnagar, and $\frac{1}{2}$ of a mile W. of Deorah village.</p> <p>λ 25 24 12.02 L 81 55 1.66 No. 84</p>	<p>Andhi Hill Mark (heliotrope). (Baghelkhand, Rewah State) On a detached hill on the right bank of Magardha nadi, and about $2\frac{1}{4}$ miles N.E. of Beharra village.</p> <p>λ 24 28 34.91 L 81 2 58.06 Nos. 49, 50</p>
<p>Allahabad, House No. 6. (Allahabad) Chimney of Mr. Wilson's house in Motiganj.</p> <p>λ 25 25 32.4 L 81 53 11.2</p>	<p>Allahabad, Pháphamau Chimney, (Allahabad) Of Powder Works on right bank of the Ganges.</p> <p>λ 25 29 49.7 L 81 54 50.2 Nos. 178, 179</p>	<p>Arail White Temple. (Allahabad)</p> <p>λ 25 25 8.5 L 81 55 29.2 No. 94</p>
<p>Allahabad, House No. 7. (Allahabad) Kalas of Rája Odidnarain's house in Motiganj.</p> <p>λ 25 25 22.9 L 81 52 55.0</p>	<p>Allahabad, Pháphamau s. (Allahabad) At S.W. extremity of village, on left bank of the Ganges.</p> <p>λ 25 31 24.78 L 81 53 58.50 Nos. 142, 143, 144</p>	<p>Ashrafpur, XXXVIII. (Vide page 9—M.)</p> <p>λ 27 29 26.81 L 81 4 9.54 H 450 h 24 No. 44</p>
<p>Allahabad, House No. 8. (Allahabad) Top of Rámsulhai's house in Kydganj.</p> <p>λ 25 25 47 L 81 53 50</p>	<p>Allahabad s. (Allahabad) On a house in Chitpur, occupied by the Surveyor General's Office in 1845.</p> <p>λ 25 26 59.68 L 81 53 40.50 Nos. 71, 72</p>	<p>Badra s. (Allahabad) About 2 miles N. of Jhúsi, and the same distance N.E. of Dáraganj.</p> <p>λ 25 27 24.86 L 81 57 13.68 No. 81</p>
<p>Allahabad, Juma Masjid, (Allahabad) Kalas.</p> <p>λ 25 25 50.3 L 81 54 32.6 No. 75</p>	<p>Allahabad, Shah Hujjat's Masjid. (Allahabad)</p> <p>λ 25 26 7.2 L 81 52 54.3</p>	<p>Badra, Sayyid's Tomb. (Allahabad)</p> <p>λ 25 27 16 L 81 57 13</p>
<p>Allahabad, Magistrate's Kachahri. (Allahabad)</p> <p>λ 25 26 42 L 81 53 32</p>	<p>Allahabad, Sikuti Temple, (Allahabad) Spire.</p> <p>λ 25 29 57.9 L 81 55 4.9</p>	<p>Bagála, XII. (Vide page 5—M.)</p> <p>λ 25 14 9.15 L 81 39 13.31 H 617 h 0 No. 9</p>
<p>Allahabad, Mangal Dás's Temple. (Allahabad) On right bank of the Jumna.</p> <p>λ 25 25 11.3 L 81 54 14.9</p>	<p>Allahabad, Sultán's Mausoleum. (Allahabad) In Khuro Bágh.</p> <p>λ 25 26 30.9 L 81 51 53.1</p>	<p>Bagála Hill Temple, (Allahabad) Dome.</p> <p>λ 25 13 34.1 L 81 40 1.2 Nos. 110, 111</p>
<p>Allahabad, Masonic Lodge. (Allahabad)</p> <p>λ 25 26 40 L 81 54 23</p>	<p>Allahabad Temple No. 1. (Allahabad) N.E. Temple in Dáraganj.</p> <p>λ 25 27 24.3 L 81 55 37.1 Nos. 79, 80</p>	
<p>Allahabad, Mr. Macaura's House. (Allahabad)</p> <p>λ 25 27 52 L 81 54 39</p>	<p>Allahabad Temple No. 2. (Allahabad) N.E. temple in Samdabad.</p> <p>λ 25 26 55.8 L 81 53 22.8 No. 78</p>	

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Bagála House. <i>(Allahabad)</i> Zamindár's house in village. λ 25 14 51.4 L 81 40 23.6 No. 115	Basti s. <i>(Bara Banki)</i> Close to and S.S.W. of village so called. λ 26 55 49.34 L 81 8 9.17	Bobandar Zamindár's House, <i>(Allahabad)</i> Staircase. λ 25 15 27.4 L 81 42 44.1 No. 116
Bahádurganj Temple. <i>(Rae Bareilly)</i> On left bank of the Ganges. λ 25 49 27.8 L 81 22 32.6	Begam Sarái. <i>(Allahabad)</i> Flag on tree, E. end of village. λ 25 27 12.6 L 81 48 14.5 No. 169	Bulbulpur Flag. <i>(Bara Banki)</i> λ 26 57 26 L 81 14 45
Bahádurpur Mat. <i>(Bara Banki)</i> λ 26 57 16.2 L 81 15 21.1	Beti Flag. <i>(Sitapur)</i> About $\frac{1}{2}$ a mile N.E. of village so called. λ 27 17 22 L 81 11 27	Burwa, V. <i>(Vide page 4—M.)</i> λ 24 33 14.48 L 81 31 17.03 H 1300 h Not forthcoming No. 5
Baisingpurwa Flag. <i>(Bahraich)</i> On mound. λ 27 37 26 L 81 21 38	Bhauri Hill Mark (heliotrope). <i>(Banda)</i> On a detached hill on left bank of Ohan nadi. Bhauri village lies at the N.E. foot of the hill. λ 25 13 32.61 L 81 6 16.64 Nos. 64, 65	Chandaha Hill Mark (heliotrope). <i>(Banda)</i> On a range of hills running N.E. and S.W. Bariári Khurd lies to N. and Dínháí to S.E. λ 25 14 48.79 L 81 32 12.69 Nos. 66, 67
Balaun Hill Mark. <i>(Allahabad)</i> On a detached hill E. of Repatna, and N.W. of Osa village. λ 25 10 54.40 L 81 44 0.53 No. 97	Bhika Masjid, <i>(Allahabad)</i> Spire of N. minaret. λ 25 29 7.4 L 81 43 3.7 No. 156	Chapri Masjid, <i>(Allahabad)</i> Centre dome. λ 25 29 52.5 L 81 48 58.0 Nos. 167, 168
Bankesar Flag. <i>(Allahabad)</i> On tree. λ 25 33 50 L 81 57 20	Bhisamda Gola Flag. <i>(Bahraich)</i> About $\frac{1}{2}$ a mile W.S.W. of station No. 189 of the Gogra River Triangulation. λ 27 12 5.5 L 81 32 53.4	Chapri s. <i>(Allahabad)</i> At southern extremity of village on N. bank of the Ganges. λ 25 29 48.34 L 81 48 58.67 Nos. 133, 134
Banwa, Khajúr Tree. <i>(Bara Banki)</i> λ 26 56 37 L 81 15 33	Bhita h.s. <i>(Allahabad)</i> E. of village. λ 25 18 31.93 L 81 50 31.82 No. 96	Chaukandi Hill Mark. <i>(Baghelkhand, Rewah State)</i> On a detached hill, N.W. of village so called. λ 25 0 27.31 L 81 26 10.03 No. 61
Bárah s. <i>(Allahabad)</i> Near gateway of old fort. λ 25 15 11.75 L 81 45 29.91 Nos. 100, 101	Bhita Temple, <i>(Allahabad)</i> White. λ 25 18 45.5 L 81 50 10.5 Nos. 108, 109	Chilári Flag. <i>(Sitapur)</i> On banian tree opposite to N.E. bastion near gateway. λ 27 33 55 L 81 20 12
Bareti s. <i>(Bara Banki)</i> About $\frac{1}{2}$ a mile S.S.W. of village so called. λ 26 57 51.75 L 81 9 33.13	Bhúri Hill Temple, <i>(Allahabad)</i> Centre. λ 25 14 17.7 L 81 42 22.5 No. 114	Chináhat s. <i>(Lucknow)</i> About $\frac{1}{2}$ of a mile S. of village so called. λ 26 52 7.13 L 81 4 33.96
Basantpur, XXIX. <i>(Vide page 8—M.)</i> λ 26 43 27.75 L 81 24 56.79 H 394 h 24 No. 35		

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<p>Dádar, III. (<i>Vide page 4—M.</i>)</p> <p>λ 24 36 13·68 L 81 14 46·40 H 1088 h <i>Not forthcoming</i> No. 4</p> <p>Daroda Flag. (<i>Rae Bareilly</i>) On tree. λ 26 19 6 L 81 19 11</p> <p>Daryabad Temple. (<i>Allahabad</i>) λ 25 43 2·1 L 81 24 40·3</p> <p>Dhakuli s. (<i>Bara Banki</i>) About 1½ miles N.W. of Nawábganj, 1½ miles W. of Bahádurpur, and 3 miles E. of Ganaura village. λ 26 57 11·07 L 81 14 8·19</p> <p>Donri, VII. (<i>Vide page 5—M.</i>) λ 24 53 56·77 L 81 13 45·65 H 1415 h I Nos. 7, 16</p> <p>Durgapur Temple, (<i>Allahabad</i>) Spire. λ 25 20 57·2 L 81 38 36·6 Nos. 122, 123</p> <p>Fatehpur Mat, (<i>Allahabad</i>) Spire, N. of village on left bank of the Ganges. λ 25 30 19·1 L 81 43 32·6 Nos. 157, 158</p> <p>Gadia s. (<i>Bara Banki</i>) About 2½ miles E. of Basti s., and 1 mile S.W. of Malukpur village. λ 26 55 53·44 L 81 10 43·44</p> <p>Ganges River a. (<i>Allahabad</i>) On tamarind tree on N. bank. λ 25 33 45 L 81 41 38 Nos. 162, 163</p>	<p>Ganges River No. 1. (<i>Allahabad</i>) Mango tree on right bank. λ 25 31 53 L 81 40 29 No. 160</p> <p>Ganges River No. 2 s. (<i>Allahabad</i>) In field N. of Asraul village. λ 25 21 50·95 L 81 45 42·20 No. 104</p> <p>Ganges River No. 3 s. (<i>Allahabad</i>) On right bank of the river. λ 25 27 43·85 L 81 48 35·52 Nos. 131, 132</p> <p>Ganges River No. 4 s. (<i>Allahabad</i>) In field. λ 25 23 19·75 L 81 49 7·05 No. 105</p> <p>Ganges River No. 5 s. (<i>Allahabad</i>) On right bank of the river. λ 25 29 14·12 L 81 53 23·50 Nos. 135, 136</p> <p>Ganges River No. 6 s. (<i>Allahabad</i>) λ 25 29 35·11 L 81 57 33·95 No. 145</p> <p>Ganges River No. 7 s. (<i>Allahabad</i>) Also called Nika s.; on N. bund of a tank, 0·3 of a mile S.E. of village of the same name, 1 mile from the left bank of the river, and 0·4 of a mile E. of Chatnagh village. λ 25 24 35·38 L 81 57 56·51 See Synoptical Volume of the Gurwáni Meridional Series.</p> <p>Ganges River No. 8 s. (<i>Allahabad</i>) Also called Nimbi No. 1 s.; on N. bank, close to it the river forms two channels, the larger of which flows under Lowana and the smaller by the station, 0·7 of a mile W. of village of the same name. Marked by a mound 8 feet in height. λ 25 23 14·54 L 81 58 4·49 See Synoptical Volume of the Gurwáni Meridional Series.</p> <p>Ganges River No. 9* s. (<i>Allahabad</i>) Also called Lowana s. or Lowen s.; on right bank, about 50 yards N. of village of the same name, and 1½ miles E. of the Grand Trunk Road from Mirzapur to Allahabad. λ 25 21 59·47 L 81 57 22·52 See Synoptical Volume of the Gurwáni Meridional Series.</p>	<p>Ganipur Flag. (<i>Allahabad</i>) On mango tree at W. extremity of village on left bank of the Ganges. λ 25 33 3 L 81 42 11 No. 159</p> <p>Ghuri s. (<i>Rae Bareilly</i>) About ¼ a mile N.W. of village so called. λ 26 16 13·66 L 81 16 43·75</p> <p>Gochaura, Zamíndár's House. (<i>Bara Banki</i>) λ 26 51 7 L 81 18 48</p> <p>Gogra River No. 164† s. (<i>Bara Banki</i>) On right bank, 1·2 miles N.W. of Dhema, and 0·4 of a mile N.E. of Nausara. λ 26 53 10·50 L 81 48 19·18</p> <p>Gogra River No. 165 s. (<i>Gonda</i>) On left bank, 0·6 of a mile N.W. of Sirsaipurwa, and 0·7 of a mile E. of the Sarju river. λ 26 54 59·14 L 81 48 17·16</p> <p>Gogra River No. 166 s. (<i>Bara Banki</i>) Also called Rudpur Ghát station; on right bank of the river, 0·3 of a mile N. N. W. of Buláki Purwa, and 0·1 of a mile E. of Rudarpur. λ 26 55 14·22 L 81 46 10·58</p> <p>Gogra River No. 167 s. (<i>Gonda</i>) On left bank, 0·7 of a mile S. of Upadia Purwa, and 0·2 of a mile W.N.W. of Pasika. λ 26 56 43·91 L 81 47 14·23</p> <p>Gogra River No. 168 s. (<i>Bara Banki</i>) On right bank, 1·1 miles N. W. of Rudpur, 0·8 of a mile N. of Basgaon, and 0·5 of a mile E. of Garhi. λ 26 56 26·22 L 81 44 32·43</p> <p>Gogra River No. 169 s. (<i>Gonda</i>) On left bank, in the centre of a large patch of Jháu jungle. λ 26 58 28·87 L 81 45 17·39</p>

* The continuation of this triangulation will be found in the Co-ordinate List of the Gurwáni Meridional Series. † The preceding portion of this triangulation will be found in the Co-ordinate List of the Gurwáni Meridional Series and the continuation in that of the North-East Longitudinal Series.

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<p>Gogra River No. 170 s. (Bara Banki) On right bank, 0.6 of a mile N.N.E. of Bhuia Purwa, 0.1 of a mile E.N.E. of Kanrsar, and 0.9 of a mile E.S.E. of Kamiari.</p> <p>λ 26 57 51.83 L 81 43 28.65</p>	<p>Gogra River No. 179 s. (Gonda) On left bank, close to and E.S.E. of Basantpur, 0.4 of a mile W.S.W. of Lalpur, and 0.3 of a mile N.W. of Padmanpur.</p> <p>λ 27 4 28.32 L 81 35 1.97</p>	<p>Gogra River No. 188 s. (Bara Banki) On right bank, 1.5 miles S.E. of Gurbakhsh Purwa, 1.1 miles S.S.E. of Sukhramsing Purwa, and 0.5 of a mile E.S.E. of Kuuine.</p> <p>λ 27 11 37.58 L 81 31 8.95</p>
<p>Gogra River No. 171 s. (Gonda) On left bank, 0.8 of a mile N.N.E. of Kamiari Ghat 0.7 of a mile S.S.E. of Rami Purwa, and 0.5 of a mile W.S.W. of Raipur.</p> <p>λ 26 59 36.14 L 81 43 18.31</p>	<p>Gogra River No. 180 s. (Bara Banki) On right bank, 0.2 of a mile N.W. of Durga Asti Purwa, 0.6 of a mile N.N.W. of Para, and 0.8 of a mile N.E. of Sipai.</p> <p>λ 27 3 40.45 L 81 32 59.37</p>	<p>Gogra River No. 189 s. (Bahraich) Also called Mathrepur station; is situated on a mound in the village, on left bank of the river, about 1/4 mile W. of Sakhi, and the same distance E.N.E. of Bhisamda Gola.</p> <p>λ 27 12 38.42 L 81 33 4.07</p>
<p>Gogra River No. 172 s. (Bara Banki) On right bank.</p> <p>λ 26 58 56.23 L 81 41 49.91</p>	<p>Gogra River No. 181 s. (Bahraich) On left bank, 0.3 of a mile S.S.E. of Adampur, 0.9 of a mile W.S.W. of Ghuranpur, and 0.6 of a mile E.N.E. of Sipah.</p> <p>λ 27 6 4.10 L 81 33 11.14</p>	<p>Gogra River No. 190 s. (Bara Banki) Also called Pande Purwa; on right bank, 0.6 of a mile N.E. of Pande Purwa, and 0.1 of a mile S.S.E. of Pandit Purwa.</p> <p>λ 27 13 40.63 L 81 30 41.95</p>
<p>Gogra River No. 173 s. (Gonda) On left bank, 0.9 of a mile S.S.E. of Garwar, and 0.6 of a mile S.W. of Aksaria.</p> <p>λ 27 0 54.08 L 81 41 13.57</p>	<p>Gogra River No. 182 s. (Bara Banki) On right bank, 1.0 mile N.N.W. of Balupur, 0.2 of a mile N.N.E. of Sisaura Purwa, and 0.8 of a mile E.N.E. of Lahra.</p> <p>λ 27 5 4.96 L 81 30 43.74</p>	<p>Gogra River No. 191 s. (Bahraich) On left bank.</p> <p>λ 27 15 17.50 L 81 31 43.30</p>
<p>Gogra River No. 174 s. (Bara Banki) Also called Lahramao Ghat station; on right bank, 1.4 miles N.E. of Manpur, and the same distance N.N.E. of Lahramao.</p> <p>λ 27 0 4.77 L 81 39 27.58</p>	<p>Gogra River No. 183 s. (Bahraich) On left bank, 0.4 of a mile E.S.E. of Bairampur Ghat, 0.7 of a mile S.S.E. of Bairampur large village, and 0.2 of a mile N.W. of Khasapur.</p> <p>λ 27 7 6.15 L 81 31 26.42</p>	<p>Gogra River No. 192 s. (Bara Banki) Also called Baniapara station; on right bank, 0.7 of a mile N. of Jammaulia, and 0.2 of a mile N.E. of Sitaram Purwa.</p> <p>λ 27 15 16.78 L 81 30 6.33</p>
<p>Gogra River No. 175 s. (Gonda) Also called Gharkunia Ghat station; on left bank, 0.3 of a mile W. of Gharkunia mud fort, 0.5 of a mile S. of Partabpur, and 0.6 of a mile S.E. of Deokalganj.</p> <p>λ 27 2 22.73 L 81 39 26.27</p>	<p>Gogra River No. 184 s. (Bara Banki) Also called Ganespur Samadh; on right bank on paku shrine of a Hindu Saint, 0.6 of a mile N.N.E. of the large village of Ganespur, 0.5 of a mile N.E. of Firozpur, and 1.2 miles S.E. of Puraina on Sota.</p> <p>λ 27 7 15.04 L 81 29 55.18</p>	<p>Gogra River No. 193 s. (Bahraich) On left bank, 0.7 of a mile S.S.W. of Girwarsing Purwa, and 0.5 of a mile W. of Gorhaia.</p> <p>λ 27 16 56.40 L 81 31 20.38</p>
<p>Gogra River No. 176 s. (Bara Banki) On right bank, 1.2 miles N.N.E. of Kawani, 1.3 miles E. of Sanawa, and 0.5 of a mile W.S.W. of Gurain Purwa.</p> <p>λ 27 1 31.69 L 81 37 18.82</p>	<p>Gogra River No. 185 s. (Bahraich) On left bank, 0.1 of a mile S.W. of Simpurwa, 0.4 of a mile W.S.W. of Niamatpur, and 1.0 mile N.N.W. of Bharah.</p> <p>λ 27 8 21.54 L 81 31 34.64</p>	<p>Gogra River No. 194 s. (Bara Banki) On right bank, 0.4 of a mile N.N.E. of Khujji, and 0.5 of a mile E.S.E. of Banar.</p> <p>λ 27 18 23.16 L 81 28 57.73</p>
<p>Gogra River No. 177 s. (Gonda) On left bank, 0.3 of a mile S.E. of Gaora, 0.4 of a mile W. of Maikup Purwa, and 0.6 of a mile N.N.E. of Sanawa Ghat.</p> <p>λ 27 3 38.29 L 81 37 8.17</p>	<p>Gogra River No. 186 s. (Bara Banki) On right bank.</p> <p>λ 27 9 42.56 L 81 30 8.87</p>	<p>Gogra River No. 195 s. (Bahraich) On left bank, 1.3 miles E. of Ghurata Ghat, 0.3 of a mile S.W. of Tankali Purwa, and 0.5 of a mile W.N.W. of Badraulia.</p> <p>λ 27 19 1.53 L 81 30 49.54</p>
<p>Gogra River No. 178 s. (Bara Banki) On right bank.</p> <p>λ 27 2 35.92 L 81 35 34.82</p>	<p>Gogra River No. 187 s. (Bahraich) On left bank, 0.6 of a mile S.S.W. of Putti, 0.9 of a mile W.S.W. of Obadhi, and 0.2 of a mile W.N.W. of Nasirganj.</p> <p>λ 27 10 33.56 L 81 32 38.81</p>	<p>Gogra River No. 196 s. (Bara Banki) On right bank, 0.6 of a mile N.E. of Pasrampur, 0.8 of a mile S.S.E. of Pharus Ghat, and 0.3 of a mile N. of Ghaunia.</p> <p>λ 27 20 9.35 L 81 27 45.83</p>

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<p>Gogra River No. 197 s. (Bahraich) On left bank, 1·3 miles S.E. of Alipur, the same distance S. of Nandwal, and 0·5 of a mile S.W. of Deokali.</p> <p>λ 27 21 9·39 L 81 30 17·67</p>	<p>Gogra River No. 206 s. (Sitapur) On right bank, 0·1 of a mile W. of Ratnapur, 0·5 of a mile N.N.W. of Ofsaria, and 0·7 of a mile E.S.E. of Daorihar.</p> <p>λ 27 26 17·54 L 81 21 21·40</p>	<p>Gogra River No. 215 s. (Bahraich) On left bank, 0·5 of a mile S.S.W. of Ramsing Purwa, and 0·4 of a mile N.N.W. of Bhola Purwa.</p> <p>λ 27 36 16·46 L 81 21 33·07</p>
<p>Gogra River No. 198 s. (Bahraich) On left bank, 0·6 of a mile S.E. of Sarsat Purwa, 0·5 of a mile S.S.W. of Sepaia, and 0·6 of a mile W.S.W. of Hosainabad.</p> <p>λ 27 22 18·04 L 81 28 11·77</p>	<p>Gogra River No. 207 s. (Bahraich) On left bank, 1·2 miles S.W. of Patkapur, and 0·7 of a mile N.W. of Chaubar.</p> <p>λ 27 28 34·56 L 81 22 31·89</p>	<p>Gogra River No. 216 s. (Sitapur) On right bank, 0·5 of a mile N. of Ranjit Purwa Tola, 0·2 of a mile N.N.E. of Ranjit Purwa, and 0·3 of a mile S.S.E. of Laodhan Tola.</p> <p>λ 27 36 54·77 L 81 19 9·69</p>
<p>Gogra River No. 199 s. (Sitapur) On right bank, 0·2 of a mile W. of Puraipur, 0·7 of a mile N.N.E. of Lelipur, and 0·2 of a mile E.N.E. of Daolatpur.</p> <p>λ 27 20 54·06 L 81 26 40·00</p>	<p>Gogra River No. 208 s. (Sitapur) On right bank, 0·2 of a mile E.N.E. of Shankarpur, 0·7 of a mile S.W. of Mangalpur, and 0·8 of a mile N.N.W. of Bitani.</p> <p>λ 27 28 14·79 L 81 19 54·34</p>	<p>Gogra River No. 217 s. (Bahraich) On left bank, 0·4 of a mile N.N.W. of Pandipura, the same distance W.S.W. of Dubha, and 0·7 of a mile S. of Ranjitsing Purwa.</p> <p>λ 27 38 22·52 L 81 21 47·30</p>
<p>Gogra River No. 200 s. (Bahraich) On left bank, 0·6 of a mile S.S.W. of Tulapur, and 1·4 miles W. of Bhaouri.</p> <p>λ 27 23 32·83 L 81 26 6·63</p>	<p>Gogra River No. 209 s. (Bahraich) On left bank, 0·5 of a mile W.N.W. of Kharkapur, and 0·7 of a mile from Naodhan in the same direction.</p> <p>λ 27 30 13·62 L 81 22 9·19</p>	<p>Gogra River α s. (Bahraich) On left bank, 0·7 of a mile S.E. of Parsadsing Purwa, and 0·9 of a mile N.W. of Orai.</p> <p>λ 27 37 3·79 L 81 23 13·05</p>
<p>Gogra River No. 201 s. (Sitapur) Also called Bhaonri Ghât s.; on right bank.</p> <p>λ 27 21 52·97 L 81 23 58·02</p>	<p>Gogra River No. 210 s. (Sitapur) On right bank, 1·2 miles N.N.E. of Rajpur, 0·5 of a mile E.N.E. of Bajwari, and 1·0 mile S. of Mujaon.</p> <p>λ 27 30 29·25 L 81 20 16·42</p>	<p>Gogra River β s. (Bahraich) On left bank, N. of Dubha and N.W. of Ranjitsing Purwa, and 0·9 of a mile W.N.W. of Nakhai.</p> <p>λ 27 38 33·32 L 81 23 21·33</p>
<p>Gogra River No. 202 s. (Bahraich) On left bank in the midst of a Jhau jungle.</p> <p>λ 27 24 38·67 L 81 23 36·39</p>	<p>Gogra River No. 211 s. (Sitapur) On right bank, 0·3 of a mile N. of Randa, 1·1 miles E. of Kamipur, and 0·7 of a mile S.S.E. of Nasirpur.</p> <p>λ 27 32 8·43 L 81 20 46·47</p>	<p>Gumsira Masjid. (Partabgarh)</p> <p>λ 25 43 43·7 L 81 26 1·1</p>
<p>Gogra River No. 203 s. (Sitapur) On right bank, 0·3 of a mile S.S.W. of Nindaora, 0·7 of a mile N.N.E. of Soharia, and 0·5 of a mile N.E. of Dombediha.</p> <p>λ 27 23 16·77 L 81 22 32·12</p>	<p>Gogra River No. 212 s. (Bahraich) On left bank, 0·8 of a mile S.E. of Zalimsing Purwa, 0·7 of a mile W.S.W. of Bahirpur, and 0·9 of a mile W.N.W. of Bolwar Purwa.</p> <p>λ 27 32 1·07 L 81 22 52·13</p>	<p>Gurwa Parur h.s. (Baghelkhand, Rewah State) On Kaimur range, 1½ miles N. W. of Baghawa village, and about the same distance W. by S. of the Rewah Topographical Survey station of Gurwa Parur.</p> <p>λ 24 30 0·67 L 81 49 3·32 H 1652 Nos. 51, 52</p>
<p>Gogra River No. 204 s. (Sitapur) On right bank, 0·9 of a mile E.S.E. of Para, and 0·4 of a mile S.W. of a Gola on nadi.</p> <p>λ 27 25 1·69 L 81 21 48·96</p>	<p>Gogra River No. 213 s. (Bahraich) On left bank, 0·9 of a mile S. of Sisai Bazar, and 0·7 of a mile W.N.W. of Sisai village.</p> <p>λ 27 33 57·47 L 81 22 16·20</p>	<p>Gutni Building. (Partabgarh)</p> <p>λ 25 42 9 L 81 26 4</p>
<p>Gogra River No. 205 s. (Bahraich) On left bank, 0·3 of a mile N.N.W. of Baghati, 0·7 of a mile from Hazari Purwa in the same direction, and 0·4 of a mile S.S.E. of Kolaila Ghât.</p> <p>λ 27 26 18·57 L 81 23 8·12</p>	<p>Gogra River No. 214 s. (Sitapur) On right bank, 0·5 of a mile N.E. of Patkapur, and 0·8 of a mile E. of Mahuabag.</p> <p>λ 27 34 48·13 L 81 19 57·60</p>	<p>Haidarganj s. (Allahabad) N. of village.</p> <p>λ 25 29 39·88 L 81 42 51·65 Nos. 126, 127</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Haraha Hill Mark (heliotrope). (<i>Bundelkhand, Panna State</i>) On a small detached range of hills running N. W. and S. E. Salaura village lies about 2 miles N. E., and Deori the same distance W.</p> <p>o ' "</p> <p>λ 24 51 39.06 L 81 0 3.86 Nos. 55, 56</p> <p>Hatiadi s. (<i>Allahabad</i>) N. E. of village.</p> <p>λ 25 32 55.56 L 81 40 2.40 Nos. 129, 130</p> <p>Hetapati Temple, (<i>Allahabad</i>) Spire. Also called Saidaganj White Temple.</p> <p>λ 25 29 31.0 L 81 58 21.2</p> <p>Hiliapura Flag. (<i>Sitapur</i>) Near village.</p> <p>λ 27 24 50 L 81 14 21</p> <p>Horesa, XIX. (<i>Vide page 6—M.</i>)</p> <p>λ 25 55 23.20 L 81 17 17.41 H_s 367.84* h 25.8 No. 24</p> <p>Ibráhimpur Idgáh, (<i>Allahabad</i>) Centre dome.</p> <p>λ 25 28 47.1 L 81 58 7.3 Nos. 92, 93</p> <p>Imlia, XXXVI. (<i>Vide page 9—M.</i>)</p> <p>λ 27 19 18.90 L 81 10 4.55 H 451 h 24 No. 42</p> <p>Ismailganj Masjid, (<i>Lucknow</i>) S. minaret.</p> <p>λ 26 52 30.0 L 81 3 12.3</p> <p>Jaliádhhar, II. (<i>Vide page 4—M.</i>)</p> <p>λ 24 22 24.55 L 81 26 42.96 H 2178 h Not forthcoming No. 1</p>	<p>Janai, XXV. (<i>Vide page 7—M.</i>)</p> <p>o ' "</p> <p>λ 26 22 6.80 L 81 23 58.30 H 417 h 24 No. 31</p> <p>Jangirabad N. E. Bastion. (<i>Allahabad</i>)</p> <p>λ 25 41 7.6 L 81 25 32.2</p> <p>Jhúsi s. (<i>Allahabad</i>) On left bank of the Ganges, about 1½ miles E. of Allahabad Fort.</p> <p>λ 25 25 35.75 L 81 56 30.59 Nos. 82, 83</p> <p>Jhúsi Temple. (<i>Allahabad</i>) Near Ghát.</p> <p>λ 25 26 18.8 L 81 56 44.2 Nos. 88, 89</p> <p>Kachár, IX. (<i>Vide page 5—M.</i>)</p> <p>λ 24 56 43.77 L 81 5 18.46 H 1467 h 1 No. 17</p> <p>Kaharpur Flag. (<i>Sitapur</i>) On tree.</p> <p>λ 27 21 57 L 81 7 15</p> <p>Kaimúr, I. (<i>Vide page 4—M.</i>)</p> <p>λ 24 17 2.15 L 81 11 49.65 H 2263 h 6 Nos. 2, 3</p> <p>Kálikinkar Temple. (<i>Partabgarh</i>) On left bank of the Ganges.</p> <p>λ 25 47 21.2 L 81 23 42.9</p> <p>Kandipur s. (<i>Allahabad</i>) N. of village.</p> <p>λ 25 30 43.33 L 81 40 53.01 No. 125</p>	<p>Kanjwara s. (<i>Bara Banki</i>) Near village so called.</p> <p>o ' "</p> <p>λ 27 0 2.35 L 81 12 17.81</p> <p>Kantua Building. (<i>Allahabad</i>) On right bank of the Ganges.</p> <p>λ 25 46 31 L 81 23 49</p> <p>Karára, XXIII.† (<i>Vide page 3—M.</i>)</p> <p>λ 24 4 42.01 L 81 18 14.47 H 1966 h 3 No. 1</p> <p>Karra, XVI. (<i>Vide page 6—M.</i>)</p> <p>λ 25 41 56.64 L 81 24 38.96 H_s 382.80* h 27 No. 12</p> <p>Khánpur, XXXIV.‡ (<i>Vide page 9—M.</i>)</p> <p>λ 27 39 0.60 L 81 11 50.98 H 439 h 12 No. 45</p> <p>Khára, XXII. (<i>Vide page 7—M.</i>)</p> <p>λ 26 7 39.62 L 81 13 10.35 H 405 h 25 Nos. 28, 29</p> <p>Kohi Hill Mark (heliotrope). (<i>Bánda</i>) About 1 mile E. of Kolgadhia, and the same distance W. of Rehutia village.</p> <p>λ 25 12 2.10 L 81 0 53.69 Nos. 62, 63</p> <p>Koleha Dák Bungalow. (<i>Allahabad</i>) E. angle of roof.</p> <p>λ 25 29 31.7 L 81 41 53.8 No. 152</p>

* Refers to the mark-stone let into the upper surface of the basement on which the tower has been built. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral. ‡ Of the North-East Longitudinal Series.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Korai Flag. (Allahabad) On Ním tree in centre of village, on right bank of the Ganges. " " " λ 25 33 20 L 81 41 7 Nos. 153, 154	Lucknow, Constantia Building s. (Lucknow) " " " λ 26 50 21.63 L 81 0 19.82	Lucknow Palace, (Lucknow) Highest Chatrī. " " " λ 26 51 30.4 L 80 58 30.3
Kotar Kaimári, VI. (Vide page 4—M.) λ 24 43 19.82 L 81 2 52.16 H 1440 h Not forthcoming No. 15	Lucknow, Dilkusha Building s. (Lucknow) " λ 26 49 42.02 L 81 0 26.84	Lucknow, Race Stand, (Lucknow) N. spike. λ 26 51 50 L 81 0 13
Kuti Ghat Temple. (Allahabad) On left bank of the Ganges. λ 25 29 17.9 L 81 57 25.1	Lucknow, Hayát Baksh House, (Lucknow) Gato opposite Dilkusha. λ 26 50 26.8 L 80 59 20.2	Lucknow Residency s. (Lucknow) " λ 26 51 41.22 L 80 58 6.16
Lálapur, XI. (Vide page 5—M.) λ 25 14 13.95 L 81 8 23.73 H 773 h Not forthcoming No. 19	Lucknow, Kamta Bungalow, (Lucknow) Centre Kalas. λ 26 52 32.6 L 81 3 53.1	Lucknow, Saádat Ali's Mausoleum, (Lucknow) Kalas. λ 26 51 14.6 L 80 58 34.3
Lowana Tree. (Allahabad) In centre of village. λ 25 21 48 L 81 57 22 See Synoptical Volume of the Gurwáni Series.	Lucknow Karbala, (Lucknow) Highest minaret. λ 26 50 58.9 L 80 59 42.2	Lucknow, Shuja-Uddaula's House, (Lucknow) Highest turret. λ 26 51 7.6 L 80 58 20.3
Lucknow, Bari Masjid, (Lucknow) Spire of N. minaret. λ 26 52 10.3 L 80 57 17.1	Lucknow, Mausoleum No. 1. (Lucknow) Kalas of Gházi-Uddín Haider's Mausoleum. λ 26 51 29.4 L 80 59 19.5	Maduapur Paka Well. (Allahabad) Near village. λ 25 24 45.3 L 81 54 36.1
Lucknow, Bari Masjid, (Lucknow) Spire of S. minaret. λ 26 52 8.4 L 80 57 17.2	Lucknow, Mausoleum No. 2. (Lucknow) Kalas of Nasir-Uddín Haider's Mausoleum. λ 26 52 31.0 L 80 58 6.7	Maduria h.s. (Allahabad) On a range of hills running S.W. and N.E., but which here turns to S.E. Kothangi lies E., and Marári Gurapur to N.W. λ 25 16 59.79 L 81 39 42.55 Nos. 102, 103
Lucknow, Begam's Mausoleum, (Lucknow) Kalas. λ 26 51 10.7 L 80 57 59.4	Lucknow Moti Mahal. (Lucknow) W. tower of palace. λ 26 51 24.1 L 80 58 58.0	Mahmudabad, Munshi's Temple. (Allahabad) " λ 25 24 24 L 81 57 2
Lucknow Church. (Lucknow) N.W. spire of church in Mariao Cantonment, 1845. λ 26 54 33.4 L 80 58 51.1	Lucknow, New Palace. (Lucknow) S. minaret of Masjid. λ 26 50 44.4 L 80 59 15.9	Majilgaon, XVII. (Vide page 6—M.) λ 25 45 15.01 L 81 13 17.73 H _s 395.53* h 25 No. 22
Lucknow Church. (Lucknow) S.W. spire of church in Mariao Cantonment, 1845. λ 26 54 33.3 L 80 58 51.0	Lucknow Observatory s. (Lucknow) " λ 26 51 12.54 L 80 58 56.93	Mámabhina s. (Allahabad) On W. bank of tank. λ 25 22 18.98 L 81 53 6.40 No. 106

* Refers to the mark-stone let into the upper surface of the pillar.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Mánikpur Fort s. (<i>Partabgarh</i>) About 1½ miles S. of Shahabad Idgáh, and the same distance N. of Aliganj village.</p> <p>λ 25 45 47.16 L 81 26 40.28</p>	<p>Mubárákpur Flag. (<i>Allahabad</i>) On tamarind tree, W. end of village.</p> <p>λ 25 31 12 L 81 46 11 Nos. 146, 147</p>	<p>Naurangabad Khajúr Tree. (<i>Bara Banki</i>)</p> <p>λ 26 58 17 L 81 13 22</p>
<p>Manjpurwa Mat. (<i>Bara Banki</i>)</p> <p>λ 26 56 42.0 L 81 13 40.9</p>	<p>Mubárákpur Square Building. (<i>Rae Bareilly</i>)</p> <p>λ 26 16 39.9 L 81 14 34.4</p>	<p>Nawábganj Flag. (<i>Allahabad</i>)</p> <p>λ 25 34 1 L 81 46 54 Nos. 150, 151</p>
<p>Mao Old Bastion, S.W. (<i>Partabgarh</i>)</p> <p>λ 25 40 49.7 L 81 27 25.2</p>	<p>Mufti-ka-purwa Flag. (<i>Allahabad</i>) On Ním tree in village.</p> <p>λ 25 28 49 L 81 43 3 No. 155</p>	<p>Nawábganj Flag. (<i>Bara Banki</i>) On Ním tree in centre of village.</p> <p>λ 26 56 9 L 81 14 26</p>
<p>Marwás, XXVI*. (<i>Vide page 4—M.</i>)</p> <p>λ 24 4 59.33 L 81 49 2.46 H 1776 h 4 No. 1</p>	<p>Muhammadabad Flag. (<i>Sitapur</i>) On tree near fort.</p> <p>λ 27 17 50 L 81 9 59</p>	<p>Niatál Flag. (<i>Sitapur</i>)</p> <p>λ 27 21 39 L 81 8 34</p>
<p>Mási, XXXV† (<i>Vide page 10—M.</i>)</p> <p>λ 27 38 25.17 L 81 25 36.15 H 425.89† h 24 No. 46</p>	<p>Muhammadpur s. (<i>Allahabad</i>) On S. end of village.</p> <p>λ 25 31 20.12 L 81 50 45.24 Nos. 187, 188, 189</p>	<p>Nimba Paka Koti. (<i>Allahabad</i>) N.W. angle of staircase, on right bank of the Ganges.</p> <p>λ 25 28 6.1 L 81 49 58.7 Nos. 170, 171</p>
<p>Masudpur s. (<i>Bara Banki</i>) About ½ a mile N.E. of village so called.</p> <p>λ 26 57 50.94 L 81 13 12.43</p>	<p>Munai, XXIII. (<i>Vide page 7—M.</i>)</p> <p>λ 26 10 51.18 L 81 23 6.97 H 397.56† h 25.5 No. 27</p>	<p>Núrpur Masjid, (<i>Sitapur</i>) S. minaret.</p> <p>λ 27 19 9.0 L 81 11 29.5</p>
<p>Mau, X. (<i>Vide page 5—M.</i>)</p> <p>λ 25 0 44.01 L 81 18 12.26 H 1381 h Not forthcoming Nos. 8, 18</p>	<p>Muskabad Flag. (<i>Sitapur</i>) On house.</p> <p>λ 27 21 19 L 81 8 54</p>	<p>Núrpur s. (<i>Sitapur</i>) About ½ a mile S.E. of village.</p> <p>λ 27 18 49.81 L 81 11 49.26</p>
<p>Man Masjid, (<i>Allahabad</i>) Centre dome, on right bank of the Ganges.</p> <p>λ 25 28 40.8 L 81 51 49.6 Nos. 172, 173</p>	<p>Nagdílpur, XIV. (<i>Vide page 6—M.</i>)</p> <p>λ 25 34 16.82 L 81 11 53.53 H 404 h 33 Nos. 18, 21</p>	<p>Ojaini Masjid, (<i>Allahabad</i>) S. minaret.</p> <p>λ 25 31 11.1 L 81 41 35.9 Nos. 164, 165</p>
<p>Mír Sáin's Takia. (<i>Allahabad</i>) Khajúr tree amongst ruins.</p> <p>λ 25 46 19 L 81 24 58</p>	<p>Náru, IV. (<i>Vide page 4—M.</i>)</p> <p>λ 24 29 38.28 L 80 59 57.90 H 1974 h Not forthcoming No. 14</p>	<p>Ojaini Mat. (<i>Allahabad</i>) N. of village, on right bank of the Ganges.</p> <p>λ 25 31 20.4 L 81 41 39.3 No. 166</p>
		<p>Ojaini s. (<i>Allahabad</i>) On Fakir's house N. of village, on right bank of the Ganges.</p> <p>λ 25 31 18.18 L 81 41 48.29 No. 128</p>

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.
pillar.

† Of the North-East Longitudinal Series.

‡ Refers to the upper surface of the

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<p>Orai s. (<i>Bahraich</i>) On a branch of the Sarju river, about ½ a mile N.W. of Bagha village.</p> <p>λ 27 35 43.41 L 81 22 44.89</p> <p>Pabei h.s. (<i>Baghelkhand, Rewah State</i>) On the highest part of the hill, about 1 mile E. of Pabei, 2 miles N. of Umrai, and 1 mile S. of Parkhuri village.</p> <p>λ 24 18 20.39 L 81 57 17.31 H 1958 Nos. 47, 48</p> <p>Pabhosa, XIII. (<i>Vide page 5—M.</i>)</p> <p>λ 25 21 17.32 L 81 21 35.58 H 565 h 0 Nos. 10, 20</p> <p>Paharnagar s. (<i>Lucknow</i>) Near Tikura village.</p> <p>λ 26 46 12.47 L 81 5 22.49</p> <p>Paighambarpur Dargah, (<i>Allahabad</i>) Centre.</p> <p>λ 25 31 9.0 L 81 58 11.8</p> <p>Paintapur, N. Masjid, (<i>Sitapur</i>) N. minaret.</p> <p>λ 27 16 46.3 L 81 13 28.6</p> <p>Parbajabad Hill Temple, (<i>Allahabad</i>) Old.</p> <p>λ 25 17 4.6 L 81 44 32.8 Nos. 112, 113</p> <p>Parewa, XXVIII. (<i>Vide page 8—M.</i>)</p> <p>λ 26 38 4.00 L 81 14 38.32 H 405.62* h 30 No. 34</p> <p>Pariáon, XVIII. (<i>Vide page 6—M.</i>)</p> <p>λ 25 50 5.26 L 81 24 43.49 H 389 h 25 No. 23</p>	<p>Parila Temple, (<i>Allahabad</i>) Spire.</p> <p>λ 25 32 47.2 L 81 56 15.1</p> <p>Pati Hill Mark (heliotrope). (<i>Bundelkhand, Panna State</i>) About 1 mile N. of Deogaon, and the same distance E. of Partabpur village.</p> <p>λ 24 52 48.20 L 81 8 49.66 Nos. 57, 58</p> <p>Pesar, XXX. (<i>Vide page 8—M.</i>)</p> <p>λ 26 48 47.87 L 81 14 47.16 H 382.36† h 25 No. 36</p> <p>Purkas Masjid, (<i>Allahabad</i>) Spire of N. minaret.</p> <p>λ 25 19 56.9 L 81 32 54.5 No. 117</p> <p>Rae Bareli Flag. (<i>Rae Bareli</i>) On tree within N. gate of fort.</p> <p>λ 26 14 1 L 81 16 12</p> <p>Ragaupur, XXXV. (<i>Vide page 9—M.</i>)</p> <p>λ 27 17 44.37 L 81 23 7.00 H 389 h 30 No. 41</p> <p>Raghunáthpur Hill Mark (heliotrope). (<i>Baghelkhand, Rewah State</i>) About 1 mile S. of village so called, and the same distance E. of Jenkalui village.</p> <p>λ 24 56 18.49 L 81 35 22.12 Nos. 59, 60</p> <p>Rangpur Flag. (<i>Allahabad</i>) On height, N.E. of temple.</p> <p>λ 25 31 32 L 81 55 6</p> <p>Rangpur Temple, (<i>Allahabad</i>) Spire.</p> <p>λ 25 31 28.6 L 81 55 0.8 Nos. 174, 175</p>	<p>Rasulabad Ghát Temple. (<i>Allahabad</i>) On right bank of the Ganges.</p> <p>λ 25 30 5.6 L 81 53 54.9 Nos. 176, 177</p> <p>Rewah, Díwán's Temple. (<i>Baghelkhand, Rewah State</i>)</p> <p>λ 24 30 33.8 L 81 20 31.7 No. 53</p> <p>Rewah Fort. (<i>Baghelkhand, Rewah State</i>) Highest building in fort.</p> <p>λ 24 31 20.5 L 81 20 0.2</p> <p>Rewah Large Temple. (<i>Baghelkhand, Rewah State</i>)</p> <p>λ 24 31 20.0 L 81 20 5.6 No. 54</p> <p>Salon, XX. (<i>Vide page 7—M.</i>)</p> <p>λ 26 1 43.97 L 81 29 44.13 H 410.15* h 25 No. 25</p> <p>Samnadio, XXXIV. (<i>Vide page 9—M.</i>)</p> <p>λ 27 10 7.34 L 81 14 1.98 H 431 h 24 No. 40</p> <p>Sarái Flag. (<i>Allahabad</i>) On tamarind tree N. of village.</p> <p>λ 25 31 40 L 81 46 14 Nos. 148, 149</p> <p>Shahabad Idgah. (<i>Partabgarh</i>)</p> <p>λ 25 46 57 L 81 26 26</p> <p>Shahzádpur s. (<i>Allahabad</i>) About 2 miles S. of Mao, and 2½ miles E. of Paharpur village.</p> <p>λ 25 39 13.55 L 81 27 0.21</p>

* Refers to the mark-stone let into the upper surface of the pillar.

† Refers to the mark-stone let into the base of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Sidik-ki-purwa House, (Allahabad) Gable end. ° ' "</p> <p>λ 25 25 5 L 81 53 34</p> <p>Singraur, XV. (Vide page 6—M.)</p> <p>λ 25 35 3'56 L 81 41 10'61 H 379 h 32 No. 11</p> <p>Sirkini h.s. (Baghelkhand, Rewah State) About a mile N.E. of Ramri village.</p> <p>λ 24 33 25'37 L 81 27 8'54</p> <p>Sirmaul, VIII. (Vide page 5—M.)</p> <p>λ 24 53 6'86 L 81 26 7'78 H 1115 h 2 No. 6</p> <p>Sora, XXIV. (Vide page 7—M.)</p> <p>λ 26 17 18'83 L 81 14 50'30 H 409 h 24 No. 30</p> <p>Sora Temple. (Rae Bareilly) In village.</p> <p>λ 26 17 32'8 L 81 15 0'3</p>	<p>Tanghan, XXI. (Vide page 7—M.)</p> <p>° ' "</p> <p>λ 26 2 52'72 L 81 19 10'10 H 409 h 25 No. 26</p> <p>Tauli, XXVI. (Vide page 7—M.)</p> <p>λ 26 27 18'43 L 81 15 21'33 H_s 412'88* h 30 No. 32</p> <p>Thāna, XXXVII. (Vide page 9—M.)</p> <p>λ 27 28 24'00 L 81 17 7'53 H 421 h 24† No. 43</p> <p>Tharwa Factory. (Allahabad) Also called Thorui Factory; flag on top of Mr. Sander's house.</p> <p>λ 25 32 33 L 81 57 32</p> <p>Tikiri, XXVII. (Vide page 8—M.)</p> <p>λ 26 32 42'59 L 81 25 1'56 H 408 h 30 No. 33</p>	<p>Tikri Gopālpur s. (Allahabad) On right bank of the Ganges. ° ' "</p> <p>λ 25 28 56'98 L 81 44 12'47 No. 124</p> <p>Tilapur, S.E. Temple. (Allahabad) Spire of large temple.</p> <p>λ 25 20 4'2 L 81 37 6'5 Nos. 118, 119</p> <p>Tilapur, W. Temple. (Allahabad) Spire of small temple.</p> <p>λ 25 20 47'5 L 81 36 36'1 Nos. 120, 121</p> <p>Turkani, XXXI. (Vide page 8—M.)</p> <p>λ 26 54 48'85 L 81 25 20'89 H_s 390'22† h 24 No. 37</p> <p>Uswar h.s. (Allahabad) On a detached hill, at the S.E. foot of which lies the village so called.</p> <p>λ 25 16 57'90 L 81 42 59'09 Nos. 98, 99</p> <p>Utiāmau, XXXII. (Vide page 8—M.)</p> <p>λ 26 59 57'08 L 81 14 44'42 H_s 404'66† h 24 No. 38</p>

* The height 412'88 refers to the surface described on page 8—M.
† Refers to the mark-stone let into the base of the tower.

† Above the bastion of the fort on which the station is built.

List of Published Works of the Great Trigonometrical Survey of India.

An Account of the Measurement of an Arc of the meridian between the parallels of $18^{\circ} 3'$ and $24^{\circ} 7'$, being a continuation of the Grand Meridional Arc of India as detailed by the late Lieutenant-Colonel Lambton in the Volumes of the Asiatic Society of Calcutta. By Captain George Everest, of the Bengal Artillery, F.R.S., &c. London, 1830.

An Account of the Measurement of two Sections of the Meridional Arc of India, bounded by the parallels of $18^{\circ} 3' 5''$; $24^{\circ} 7' 11''$; and $29^{\circ} 30' 18''$. By Lieutenant-Colonel Everest, F.R.S., &c., late Surveyor General of India, and his Assistants. London, 1847.

Account of the Operations of the Great Trigonometrical Survey of India.

- Volume I. The Standards of Measure and the Base-Lines, also an Introductory Account of the early Operations of the Survey, during the period of 1800-1830. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey. Dehra Dún, 1870.
- Do. II. History and General Description of the Principal Triangulation and of its Reduction. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.
- Do. III. The Principal Triangulation, the Base-Line Figures, the Karáchi Longitudinal, N.W. Himalaya, and Great Indus Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1873.
- Do. IV. The Principal Triangulation, the Great Arc (Section 24° - 30°), Rahún, Gurbágarh and Jogi-Tíla Meridional Series, and the Sutlej Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1876.
- Do. V. Details of the Pendulum Operations by Captains J. P. Basevi, R.E., and W. J. Heaviside, R.E., and of their Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún and Calcutta, 1879.
- Do. VI. The Principal Triangulation of the South-East Quadrilateral including the Great Arc—Section 18° to 24° , the East Coast Series, the Calcutta and the Bider Longitudinal Series, the Jabalpur and the Biláspur Meridional Series, and the Details of their Simultaneous Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1880.

List of Published Works of the Great Trigonometrical Survey of India—(Continued).

Account of the Operations of the Great Trigonometrical Survey of India—(Continued).

- Volume VII. General Description of the Principal Triangulation of the North-East Quadrilateral including the Simultaneous Reduction and the Details of Five of the Component Series, the North-East Longitudinal, the Budhon Meridional, the Rangir Meridional, the Amua Meridional, and the Karára Meridional. Prepared under the directions of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
- Do. VIII. Details of the Principal Triangulation of Eleven of the Component Series of the North-East Quadrilateral, including the following Series; the Gurwáni Meridional, the Gora Meridional, the Hurílaong Meridional, the Chendwár Meridional, the North Párasnáth Meridional, the North Malúncha Meridional, the Calcutta Meridional, the East Calcutta Longitudinal, the Brahmaputra Meridional, the Eastern Frontier—Section 23° to 26°, and the Assam Longitudinal. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
- Do. IX. Electro-Telegraphic Longitude Operations executed during the years 1875-77 and 1880-81, by Lieut.-Colonel W. M. Campbell, R.E., and Major W. J. Heaviside, R.E. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1883.

Synopses of the Results of the Great Trigonometrical Survey of India, comprising Descriptions, Co-ordinates, &c., of the Principal and Secondary Stations and other Fixed Points, of the Several Series of Triangles, as follows;—

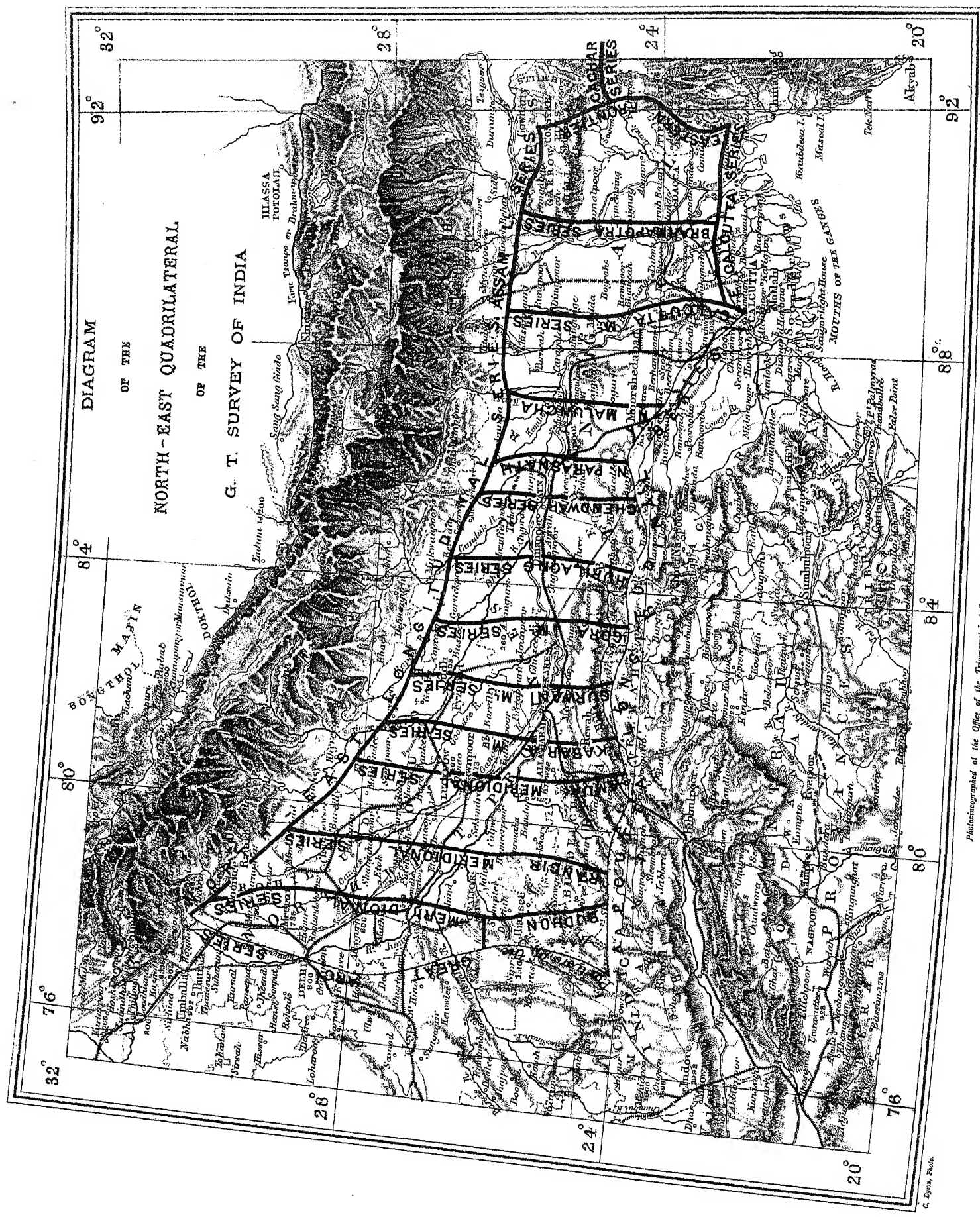
- Volume I. The Great Indus Series, or Series *D* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. II. The Great Arc—Section 24° to 30°, or Series *A* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. III. The Karáchi Longitudinal Series, or Series *B* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. IV. The Gurhagarh Meridional Series, or Series *F* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. V. The Rahún Meridional Series, or Series *E* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VI. The Jogí-Tíla Meridional Series, or Series *G*, and the Sotlej Series, or Series *H* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VII. The North-West Himalaya Series, or Series *C* of the North-West Quadrilateral, and the Triangulation of the Kashmir Survey. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.

List of Published Works of the Great Trigonometrical Survey of India—(Continued).

Synopses of the Results of the G. T. Survey of India, &c.—(Continued).

- Volume VIII. The Great Arc—Section 18° to 24° , or Series *A* of the South-East Quadrilateral.
By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Superintendent of the Survey,
and his Assistants. Dehra Dún, 1878.
- Do. IX. The Jabalpur Meridional Series, or Series *E* of the South-East Quadrilateral.
By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and
Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.
- Do. X. The Bider Longitudinal Series, or Series *D* of the South-East Quadrilateral.
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XI. The Biláspur Meridional Series, or Series *F* of the South-East Quadrilateral.
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XII. The Calcutta Longitudinal Series, or Series *B* of the South-East Quadrilateral.
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIII. The East Coast Series, or Series *C* of the South-East Quadrilateral. By Major-
General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and
Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIV. The Budhon Meridional Series, or Series *J* of the North-East Quadrilateral.
By Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General
of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1883.
- Do. XV. The Rangír Meridional Series, or Series *K* of the North-East Quadrilateral.
By Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General
of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1883.

March, 1883.



C. Dyer, India.

Photographed at the Office of the Trigonometrical Branch, Survey of India, Dehra Dun, December 1892

A. G. Oakes, Esq.

SYNOPSIS OF THE RESULTS OF THE OPERATIONS OF
THE GREAT TRIGONOMETRICAL SURVEY OF INDIA

VOLUME XVII.

DESCRIPTIONS AND CO-ORDINATES
OF THE

PRINCIPAL AND SECONDARY STATIONS AND OTHER FIXED POINTS OF

THE GURWANI MERIDIONAL SERIES

OR SERIES N

AND THE GORA MERIDIONAL SERIES

OR SERIES O

OF THE

NORTH-EAST QUADRILATERAL.

BY LIEUT.-GENERAL J. T. WALKER, C.B., R.E., F.R.S., &c., &c.,
SURVEYOR GENERAL OF INDIA, AND SUPERINTENDENT OF THE TRIGONOMETRICAL SURVEY,
AND HIS ASSISTANTS.



Dehra Dun:

PRINTED AT THE OFFICE OF THE TRIGONOMETRICAL BRANCH, SURVEY OF INDIA.

B. V. HUGHES.

1883.

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ERRATA ET ADDENDA.

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- VII—*N.* *After* last para. but one from bottom *Add* Subsequently, in October 1848, a party of the Huriláong Meridional Series determined the course of the Ganges River further eastwards to Chunar. This triangulation was executed by Mr. G. W. Armstrong working on one bank with a 12-inch, and Mr. G. Terry on the other bank with a 7-inch theodolite: it emanated from Bindbáchal s. (Ganges River No. 47 s.) and closed on the side Murli h.s. to Chunar Fort Flagstaff; between the finally determined position-values of which the triangulation has been adjusted. Besides fixing the position of some permanent temples and buildings on both sides of the river, the operation also determined several important points in Mirzapur. The results have for convenience been exhibited in the Synoptical Volume of the Gurwáni Meridional Series: they will be found included in the Supplementary Co-ordinate List.
- 33—*N.* Batawa Building. *Note.*—Since this Volume was passed through the press it has been discovered that this point is identical with Batauwa Bungalow in the Supplementary Co-ordinate List, and the data given for Batauwa Bungalow on page 47—*N.* are to be preferred as more accurate.
- 35—*N.* line 1, col. 2 *for* Ganges River No. 7 s. *read* Ganges River No. 7* s.
- „ at bottom of page *Add* footnote as follows:—* The preceding portion of this triangulation will be found in the Co-ordinate List of the Karára Meridional Series, Synoptical Vol. XVI.
- 37—*N.* line 1, col. 2 *for* Ganges River No. 49 s. *read* Ganges River No. 49* s.
- „ at bottom of page *Add* footnote as follows: * The continuation of this triangulation will be found in the Supplementary Co-ordinate List, page 48—*N.*
- 42—*N.* Mirzapur Court House. *Note.*—Since this Volume was passed through the press it has been found that this point is identical with Ganges River No. 55 s. in the Supplementary Co-ordinate List, and the data given on page 48—*N.* are to be preferred as more accurate.

GORA MERIDIONAL SERIES.

- 20—*O.* in description of Bahradal Hill Mark *for* Dadhi *read* Dúdhi
- 31—*O.* Rámgarh Temple. *Note.*—Since this Volume was passed through the press it has been discovered that this point is identical with a similarly named point in the Supplementary Co-ordinate List of the Gurwáni Series, and the data as furnished in the latter are to be preferred as being more accurate.

REFERENCES.



The abbreviations employed in the text are as follows:—

h.s. denotes hill station secondary

s. „ station secondary

These abbreviations are only placed after stations where a theodolite has been set up and observations taken to surrounding points.

The latitudes and longitudes of all points shown on the Chart at the end of each series will be found in the text. The latter exhibits numerical values of triangles only to points of a superior class, to which alone, if exhibited on the Charts, lines are drawn: the lines are either continuous throughout, or dotted for half the length and continuous for the other half: the dots indicate that the bearing was not observed, and in such cases numerical values of azimuths are not given. For other points, difficult to identify or of comparatively less accuracy, numerical values of triangles or azimuths are not given.

March, 1883.

W. H. COLE,

In charge of Computing Office.

PREFACE.

The Gurwáni and the Gora Meridional Series are the fifth and the sixth meridional series from the west of the sixteen chains of triangles included in the Section of the Principal Triangulation of the Survey of India which has been named the North-East Quadrilateral. This Section embraces the area within the Meridians of 78° and 92° and the Parallels of 28° and 30° ; and for reasons explained in Section 7 of Chapter I of Volume II of the *Account of the Operations of the Great Trigonometrical Survey*, its general reduction was postponed till that of the neighbouring Quadrilaterals, viz., the North-West and South-East, had been completed, whereby two of the Series, the Great Arc, Section 24° to 30° , and the Calcutta Longitudinal, entering the periphery of the North-East Quadrilateral, became finally fixed. The general principles of the Simultaneous Reduction, and the procedure followed in carrying it out, are the same as have been explained in Volume II of the *Account of the Operations, &c.*, and full details of the whole of the principal triangulation which is at present included in the Quadrilateral, will be found in Volumes VII and VIII of the *Account of the Operations, &c.*

As however the entire contents of the volumes of the principal triangulation are not needed by geographers and surveyors, and moreover as these volumes give no details of the secondary triangulation—which is of considerable value for local requirements—it is obviously desirable that synopses of the final results of the whole of the operations, including the secondary as well as the principal triangulations, should be published for general use, in such a form as to be most suitable for convenience of reference. This has already been done as follows;—

- I. Great Indus Series.
- II. Great Arc, Section 24° to 30° .
- III. Karáchi Longitudinal Series.
- IV. Gurhāgarh Meridional Series.
- V. Rahún Meridional Series.
- VI. Jogí-Tíla and Sutlej Series.
- VII. North-West Himalaya Series.

For those forming the South-East Quadrilateral,

- VIII. Great Arc, Section 18° to 24° .
- IX. Jabalpur Meridional Series.
- X. Bider Longitudinal Series.
- XI. Biláspur Meridional Series.
- XII. Calcutta Longitudinal Series.
- XIII. East Coast Series.

And for the following Series of the North-East Quadrilateral,

- XIV. Budhon Meridional Series.
- XV. Rangír Meridional Series.
- XVI. Amua and Karára Meridional Series.

Already published.

The present is the 17th Synoptical Volume and the fourth of those appertaining to the North-East Quadrilateral; and it has been made to include both the Gurwáni and the Gora Meridional Series, partly because portions of the same districts enter both series and it is therefore convenient to have all the results in one volume, and partly because the available matter is insufficient for two volumes.

It gives the results of the whole of the triangulation executed in connection with these series, both the principal, which was executed with theodolites having azimuthal circles of 15, 18 and 24 inches in diameter read by 3 and 5 micrometer microscopes, and the secondary, which was executed with smaller theodolites read by verniers.

By the process of reduction which has been followed the principal triangulation has been rendered perfectly consistent, both internally and externally; internally, so that if in any one of the several polygonal figures of which the chains may be composed, calculations are carried from one station to another in every possible direction, the same results will be inevitably deduced; and externally, so that the values of the co-ordinates of any station, when computed from the given co-ordinates of any other station, with the final linear and angular data, will be the same, whether the calculation is carried directly through the series, or circuitously through any of the other chains of triangles comprising the North-East Quadrilateral. All secondary triangulations which emanate from one side of the principal series and close on another side thereof, or on a contiguous series, have also been made consistent throughout.

As regards the general arrangement of this volume, it is necessary to point out that the several sections have been prepared and printed at different times, and that the work has extended over several years. The Introductions to each series and the Names and Descriptions of the Principal Stations were originally prepared for Volume VIII of the *Account of the Operations, &c.*, and when a sufficient number of copies had been printed for that work, additional copies were struck off for the present Synopsis. The Alphabetical and Numerical Lists of Principal Stations, pages 1—*N*, and 2—*N*, and 1—*O*, and 2—*O*, as well as the Names and Descriptions of the Principal Stations of the Gora Series, pages 3—*O*, to 8—*O*, were printed prior to the year 1868, when the general programme for the final reduction of the whole of the Triangulation of India was drawn up; there was then a long pause in the printing, while the Simultaneous Reductions of the North-West, South-East and North-East Quadrilaterals were being completed; this was done by the year 1877, when the secondary triangulation was adjusted in accordance with the principal, and then the printing of this volume was resumed.

The paging of each series starts from unity and is therefore not continuous throughout this volume. This was necessitated by the order of routine which had to be adopted in printing the successive subjects embraced in each and which is the same for all. The paging of each series is however distinguished by using a capital letter as a subscript to the numerals; thus all the paging which has reference to the Gurwáni Meridional Series has the subscript *N*, and that to the Gora Meridional Series the subscript *O*.

The data given in this volume are the following:—

First (pages 1—*N*, 1—*O*), alphabetical lists of the names of the principal stations, showing the numbers assigned to them, which were employed in the reductions as being more convenient to use than names.

Second (pages 2—*N*, 2—*O*), numerical lists giving the names corresponding to the numbers.

Third (pages 3—*N*, 3—*O*), descriptions of the principal stations—of their structure and positions—as taken from the original records of the observations, and supplemented by Addenda (pages 9*—*N*, 9*—*O*) giving the most recent information of their condition which has been received up to date.

Fourth (pages 9—*N*, 9—*O*), the angles and sides of the principal triangles, numbered and arranged in order from south to north.

Fifth (pages 12—*N*, 12—*O*), the angles and sides of certain secondary triangles. The numbering is here made consecutive to that of the principal triangles, in order to facilitate references which are made in other sections to the place where the length of a side is to be found.

Sixth (pages 23—*N*, 16—*O*), the azimuths of surrounding stations and points, at principal, principal-auxiliary, and secondary stations, the latter arranged in alphabetical order.

Seventh (pages 32—*N*, 20—*O*), the co-ordinates and descriptions of all stations and points arranged in alphabetical order.

The heights of the stations of the Gurwáni Meridional Series depend in the first instance on the finally determined values of the stations of Chapri and Pokra of the Calcutta Longitudinal Series (of the South-East

Quadrilateral), and on the spirit-leveled height of Saibara of the North-East Longitudinal Series, whilst those of the Gora Meridional Series depend on the finally determined values of the stations of Gora and Sewádhi of the Calcutta Longitudinal and on the spirit-leveled height of Gharbaria and on the fixed height of Dharamsingua of the North-East Longitudinal Series. In addition to these fixed heights, the heights of Stations VII, VIII, XXII, XXIV and XXV of the Gurwáni Meridional Series, and the heights of Stations VIII, IX, X, XII, XIV, XV, XVII, XVIII, XX, XXII, XXIV and XXVI of the Gora Meridional Series were determined by the Spirit-leveling Operations of this Branch of the Department, and those of Stations XIX and XXIII of the former series were determined by similar operations of the Revenue Branch. The manner in which the heights of the remaining stations have been made to accord with those above designated, is explained in Section 7 of Chapter II, Part I of Volume VII of the *Account of the Operations, &c.* The datum to which all heights have been referred is the mean sea level of Karáchi (Kurrachee). It may be here stated that all trigonometrically determined heights invariably refer to the upper surfaces of the central masonry pillars which are constructed for the instruments to stand on. Spirit-leveled values sometimes refer to the upper surface and sometimes to the basement of the pillar, whichever the leveling staff was set on; a description of the exact point referred to is given in each instance in footnotes to the pages of the Co-ordinate Lists, commencing on pages 32—*x*. and 20—*o*. respectively.

It has not been considered necessary to publish the whole of the details of the secondary triangulation, portions having been executed originally for preliminary geographical purposes, to facilitate the construction of a first map of India, and the objects observed having in many instances been flags and temporary marks which must long since have disappeared. The sides and angles of 264 triangles for the Gurwáni Meridional Series and of 80 triangles for the Gora Meridional Series, which were selected as most likely to be still in existence and of future use, and the azimuths of all these sides, have been given; but for a number of other points the co-ordinates only have been given. With the aid of Nos. X, XI and XII of the *Auxiliary Tables to facilitate calculations of the Survey Department of India*, Dehra Doon 1868, local surveyors, working on a system of rectangular co-ordinates, can readily transform the spheroidal co-ordinates here given to suit their own requirements.

The Longitudes depend on an astronomically determined value of the longitude of the Madras Observatory, $80^{\circ} 17' 21''$, which was deduced about the year 1815. There has long been reason to believe that this value was about $3'$ too great; but, pending the final determination of the longitude of the Madras Observatory, it has not been considered desirable to alter the value, which has therefore been maintained up to the present time. An electro-telegraphic determination of the longitude of Madras from Greenwich, commencing with the difference between Suez and Greenwich—determined, in 1874, under the superintendence of the Astronomer Royal—was completed in 1877 by the determination of the difference between Suez and Madras, by Captains Campbell and Heaviside, as a part of the operations of this Survey. The combined result places the Observatory at Madras in Long. $5^{\text{h}} 20^{\text{m}} 59^{\text{s}}.42 = 80^{\circ} 14' 51''.30$. Thus the following precept may be accepted with considerable confidence,—

**All the values of longitude in this volume require a constant correction,
probably of $-2' 30''$.**

As regards the orthography of Indian names in the present volume. The Alphabetical and Numerical Lists of Principal Stations, at the commencement of the volume, were printed before the year 1868, in accordance with the rules introduced by Colonel Everest for use in the Survey Department. Subsequently, in 1874, several provincial lists of spellings, constructed under the immediate orders of the Government of India, were received; and thereafter the newly authorised spellings were adopted for all names and other words contained in these lists; but for words for which there was no specific authority, the spellings have been framed in accordance with the methods followed in the preparation of the published lists, reference being made in the present instance more particularly to the Gazetted Lists for the North-West Provinces and Oudh. As a general rule the pronunciations of the vowels are as follows:—*a* has a variable sound as in woman, rural, paltry; *á* as in tartan; *i* as in bit; *í* as in ravine; *u* as in bull; *ú* as in rural; *o* as in note; *e* as *a* in say; *au* as *ou* in cloud; *ai* as *i* in ride.

The Charts accompanying this volume show the whole of the principal stations and triangulation, the positions of all the secondary points, and those portions of the secondary triangulations of which full details of the

angles, sides and azimuths are given. With the aid of the Charts it is hoped that little difficulty will be met with in finding out any of the data which may be required. The descriptions of the secondary stations are in some cases not as full and clear as is to be desired: this arises from the inadequacy of the information entered on the spot by the surveyors in their field books; every effort has been made to supplement the field books, whenever it was found practicable to do so, in order to facilitate the future identification of the stations; all the information which is forthcoming has now been given.

The general arrangement of this volume and the preparation of the data which it contains have been the work, at different times, of Mr. Hennessey, M.A., F.R.S., Major Herschel, R.E., F.R.S., and Mr. Cole, M.A. Major Herschel moreover supervised the Simultaneous Reduction of the North-East Quadrilateral of which these Series form a portion, while the Introductions to them were written by Colonel B. R. Branfill. Great pains have been taken to secure the utmost accuracy in preparing the data and passing them through the press.

(for GENERAL J. T. WALKER)

DEHRA DUN, }
March, 1883. }

J. B. N. HENNESSEY,

Offg. Dy. Surveyor General,

In charge Great Trigonometrical Survey of India.

GURWANI MERIDIONAL SERIES.

GURWANI MERIDIONAL SERIES—(LONG. $82^{\circ} 20'$).

INTRODUCTION.

In the Autumn of 1844 the Hon'ble Court of Directors of the East India Company expressed a desire that the Gurwáni Meridional Series, the next in order east of the Karára Meridional Series, should be taken up and completed as soon as possible, together with the other alternate series adjacent, which had been omitted, or purposely deferred in the first instance, as these series were now urgently needed for the completion of the Atlas of India.

Accordingly in August 1845, when reporting the completion of the Karára Series, the Surveyor General, then Captain A. S. Waugh, Bengal Engineers, stated to the Government that he purposed employing the two parties that had been engaged in that work, upon the Gurwáni and the East Coast Series, assigning the former to the party under Captain J. S. Du'Vernet.

The Series was begun towards the end of 1845, and successfully brought to a conclusion in two seasons by the 24th of May 1847 by this officer and his assistants.

The Gurwáni Meridional Series was so called because it was carried along the meridian of Gurwáni Hill Station (of the Calcutta Longitudinal Series), at which the initial Azimuth of the Series was observed. Its linear and other geodetic values were derived in the first instance from those of the side Chapri-Pokra of the Calcutta Longitudinal Series, in the Native State of Rewah (Lat. $24^{\circ} 19'$), whence it extends northwards in a single series of thirty-two triangles along the meridian of $82^{\circ} 20'$ to the side Saibara-Bansídila of the North-East Longitudinal Series in the Gonda district of Oudh, N.W. Provinces, in Lat. $27^{\circ} 26'$, a total distance of 211 miles, traversing the districts of Mirzapur, Allahabad, Jaunpur, Partabgarh, Sultanpur, Fyzabad, and Basti. The six southernmost stations lie in the hilly tract of the Kaimúr range and its outliers south of the Ganges midway between Allahabad and Mirzapur, about the Son (Soane) river.

The rest of the Series lies wholly in the plains for about 160 miles, crossing the rivers Ganges, Gumti, and Gogra (Ghágra), and consists of 26 tower stations averaging 25 feet in height, the rays between each pair of which required to be laboriously traced and cleared.

Concurrently with the principal triangulation a great many secondary stations and landmarks were fixed, and many villages and points of a tertiary order determined for topographical or geographical purposes.

The positions of the important towns of Allahabad, Mirzapur, Jaunpur, Fyzabad, and Oudh (Ajodhya) were determined, the course of the river Ganges laid down for a distance of

95 miles, and some years subsequently that of the Gogra or Sarju for about 70 miles in a direct line.

Having suffered severely from jungle fever, contracted whilst finishing the northern part of the Karára Series, Captain Du'Vernet was sent away on sick leave to the Mussooree Hills for three months during the recess of 1845, and only returned to the Surveyor General's head quarters at Allahabad on 15th September when he received charge of the Gurwáni Series. Before the end of the month he had despatched his assistants to com-

Season 1845-46.

PERSONNEL.

Captain J. S. Du'Vernet, 1st Assistant.
Mr. J. Mulheran, Senior 1st Class Sub-Assistant.
" W. Glynn, Junior " "
" F. C. Blewitt, 3rd Class "

mence the preliminary operations, but he himself remained in the Surveyor General's Office at Allahabad on account of his health till the middle of October. Meanwhile the Surveyor General proceeded with a portion of the party to Sora T.S. of the Karára Meridional Series; here he observed an astronomical Azimuth and took a series of observations to test the merits of the 18-inch theodolite by Saiyad Mir Mohsin† in use with this party, which shewed that the angles measured with this instrument were liable to peculiar errors, apparently of graduation, to eliminate which needed special precautions.

On the 18th October Captain Du'Vernet proceeded to superintend the laying out of the Gurwáni Series, and by the middle of December the approximate series throughout the hilly tract being complete, commenced the final observing by taking an astronomical Azimuth at Gurwáni, which was successfully finished by the 2nd of January 1846. He then proceeded to observe at the undermentioned hill stations in the following order:—Chapri (XXIX)*, Pokra (XXXI)*, Murchia (I), Kasda (II), Jamaura (III), Katra (IV), Tikor (V), and Meja (VI), completing the Series south of the Ganges by the 9th March, after which he connected the secondary series for laying down the course of the river between Allahabad and Mirzapur, and then continued the final observations at the following tower stations, north of the river:—Barápur (VII), Ganeshpur (VIII), Marár (XI), Seona (IX), and Birua (X), taking a set of star observations for Azimuth at Marár, between the 3rd and 19th of April, after which he went into recess quarters at Allahabad on the 5th of May.

The out-turn of work completed this first season consisted of eleven new principal stations (five of them towers) selected, built, and finally observed at; extending the Series to Marár (XI) 94 miles north of its origin by a single series of 11 large symmetrical triangles, two astronomical Azimuths, and a large proportion of secondary triangulation, which will be noticed in detail hereafter.

The principal observations hitherto, were made with Saiyad Mir Mohsin's 18-inch theodolite† which Captain Du'Vernet had previously used in the North-East Longitudinal, and in the Karára Series. But in view of the liability to error detected in this instrument, abovementioned, it was now discarded and has not again been used.

Before taking the field for the ensuing season 1846-47, the 24-inch theodolite (No. 1) designed by Captain Waugh‡, with five horizontal micrometers instead of three, was issued for

* Of the Calcutta Longitudinal Series.

† For a description of this instrument see page 67 of the Appendices to Vol. II.

‡ For a description of this instrument see pages 55 to 57 of the Appendices to Vol. II.

use, and all the remaining principal angles of the Gurwáni Series were measured by it; and, although more than half the former season's triangulation lay in the hills, whilst that of the next season lay in the plains, with tower stations throughout, and presumably worse rays and signals, the average triangular error was reduced from $2''\cdot2$ to $1''\cdot3$.

The party took the field about the middle of October, and, leaving the big theodolite in store at Allahabad, proceeded to complete the approxi-

Season 1846-47.

PERSONNEL.

Captain J. S. Du'Vernet, 1st Assistant.
Mr. J. Mulheran, 1st Class Sub-Assistant.
" T. Olliver, " (vice
" W. Glynn resigned).
" F. C. Blewitt, 3rd Class "

mate series, from the point at which the principal observations had been concluded the previous season. This proved a more difficult task than had been anticipated, owing to the swampy and wooded state of the country. The clearing of each 11- or 12-mile ray occupied nearly a week, an unusually slow rate of progress for the Officers engaged on

this Series; but with perseverance, good arrangements, and good fortune, the towers were built, and the rays cleared in time for the principal observations to be begun soon after the middle of February 1847.

Captain Du'Vernet himself took part in the approximate series, working northwards until the Series was well advanced towards its terminus, when he retraced his steps about the middle of December, inspecting the tower-building and ray-clearing in progress, on his way to get the big theodolite, with which he returned to Bisaul (XXIII), his first station for the final observations, by the middle of January. Here he observed an astronomical Azimuth to λ Ursæ Minoris at both elongations, between 20th January and the 5th of February. This done, he took up the final observations to the northward first, in the district of Gonda, in order to get away from that unhealthy part of the country as early as possible, and completed the work with the 24-inch theodolite at the undermentioned tower stations as follows:—

at Bisaul	(XXIII)	between	January	19th	and	February	23rd
„ Kumeria	(XXV)	„	February	26th	„	March	3rd
„ Sabanjot	(XXVII)	„	March	4th	„	„	6th
„ Mánapára	(XXIX)	„	„	8th	„	„	13th
„ Bansídila	(XLV)†	„	„	14th	„	„	15th
„ Saibara	(XLIII)†	„	„	16th	„	„	17th

the two last forming the terminal side of this Series on the north. He now returned southwards and continued the final observing without interruption, as follows:—

at Gurúnagar	(XXX)	between	March	19th	and	March	21st
„ Kopa	(XXVIII)	„	„	22nd	„	„	24th
„ Mánapára	(XXIX)	„	„	25th	„	„	26th (second visit)
„ Tikeria	(XXVI)	„	„	27th	„	„	30th
„ Orejhár	(XXIV)	„	April	1st	„	April	4th

† Of the N.E. Longitudinal Series.

at Bisaul	(XXIII)	between April	7th	and April	9th	(second visit)
„ Ráhet	(XXII)	„	10th	„	11th	
„ Nansa	(XXI)	„	12th	„	13th	
„ Rarauli	(XX)	„	18th	„	20th	
„ Sirwára	(XVIII)	„	21st	May	2nd	
„ Dopáp	(XVII)	May	3rd	„	6th	
„ Newa	(XVI)	„	7th	„	9th	
„ Saifabad	(XV)	„	10th	„	14th	
„ Parípura	(XIV)	„	15th	„	17th	
„ Newáda	(XIII)	„	18th	„	19th	
„ Rámapura	(XII)	„	19th	„	21st	
„ Marár	(XI)	„	22nd	„	23rd	
„ Birua	(X)	„	23rd	„	25th	

This was an uncommonly good season's work consisting of twenty-one tower stations in a low, flat, and swampy country, forming a single chain of triangles by which the Series was carried to its terminus, a distance of 120 miles on the meridian, covering an area of some 1200 square miles of thickly inhabited country, besides a large amount of secondary triangulation by which the position of a great number of places was duly fixed *.

On the completion of the Simultaneous Reduction of the North-East Quadrilateral, it was found that the following errors had been actually dispersed over the Gurwáni Series, between its origin Chapri-Pokra of the Calcutta Longitudinal Series, and its terminus, Saibara-Bansídíla of the North-East Longitudinal Series:—

In Logarithm of the side — $0.0000162,2 = - 2.38$ inches per mile.

„ Azimuth „ + $1''.317$

„ Latitude of Bansídíla — 0.312

„ Longitude „ — 0.210

The heights of the Gurwáni Series were computed in the first instance from the trigonometrical values of the side of origin Chapri-Pokra northwards to the terminal side Saibara-Bansídíla. Subsequently, the height above mean sea level of eight stations of the Series (VII, VIII, XIX, XXII, XXIII, XXIV, XXV, and Saibara) was determined by the spirit-leveling operations of the department; these shew that the trigonometrical height of Barípur (VII) was erroneous by -10.2 feet, that of Kumeria (XXV) by -13.2 feet (the maximum cumulative error disclosed throughout the Series, 211 miles in length), and that of the closing station Saibara by -11.6 .

The largest error detected here by the spirit-leveling, on any line between adjacent stations, amounted in one instance (between Barípur and Ganeshpur) to 5.3 feet.

The actual corrections which were made eventually to the trigonometrical heights of the thirty-two stations of the Series, to make them correspond with the spirit-leveled values, averaged 5 feet to each of the eight southernmost stations, extending for a distance of 68

* "Thus finishing the Gurwáni Series in the unprecedented short space of two seasons—a brilliant achievement reflecting the highest credit on Captain Du'Vernet and his party". Quotation from Surveyor General's Progress Report for the year ending 1st October 1847.

miles from the side of origin to the first spirit-leveled check, and 3 feet to each of the remaining twenty-four stations, extending over a distance of 143 miles, checked by spirit-leveled points at intervals of 70, 32, and 41 miles, up to the terminal station, Saibara. For further particulars regarding this dispersion of error in the trigonometrical leveling, see page 39 of Part I of Volume VII of the *Account of the Operations of the Great Trigonometrical Survey of India*.

Secondary Triangulation.

A very large amount of secondary triangulation was done by the Gurwáni Series party, especially in the hilly tract to the south of the Ganges, and in the populous districts of Allahabad, Mirzapur and Jaunpur.

In the *first* place a great number of points were observed by Captain Du'Vernet with the large theodolite from the hill stations, whilst conducting the operations in 1845-46, south of the Ganges, supplemented by observations made at the points with a small theodolite. This fixed amongst others the position of Mirzapur Church.

Secondly. A great extension of the secondary triangulation was made, especially on the west flank, by Mr. Mulheran with a 12-inch theodolite, in the tract of country above mentioned.

Thirdly. The ray-trace surveys were utilized for determining the landmarks and places that were observed *en route*.

Fourthly. A minor series was carried from Birua T.S. (X) to Allahabad by Mr. Mulheran with a 12-inch theodolite, for the purpose of determining the position of a number of new points or landmarks in and about Allahabad, in addition to those which had already been laid down from the two adjacent principal stations of the Karára Series, Bagála and Singraur. As the stations of this triangulation were not permanently marked and are therefore not likely now to be found, the usual details of the triangles are not published, but only the latitudes and longitudes of the stations and permanent points whose positions were determined.

Fifthly. A ray-trace triangulation was carried during the recess season of 1846 by Mr. Mulheran with a 12-inch theodolite, a distance of 22 miles, from Allahabad Church to Bagála T.S., along the river Jumna; this also checked a number of points which had been previously observed by Captain Shortrede, whilst conducting the final operations of the Karára Series, in the account of which series, mention of this work is made.

Sixthly. A minor series was carried in 1845-46 by Mr. Glynn with a 12-inch theodolite, a distance of 50 miles in a direct line, along the river Ganges, fixing 95 miles of its tortuous course, from Mirzapur to Jhúsi (at the junction of the rivers Ganges and Jumna), which, with another point (Moia), had also been determined by triangulation appertaining to the Karára Series.

Seventhly. A ray-trace triangulation was run along the river Ganges from Allahabad Church to Singraur T.S., both belonging to the Karára Meridional Series, in the account of which this work will be found mentioned. It was done by Mr. Glynn with a 12-inch theodolite in August 1846.

So far the abovementioned secondary work was done in the season of 1845-46, Messrs. Mulheran and Glynn remaining in the field during the summer recess of 1846.

As but few points could be observed directly from the principal stations in the plains to the north of the Ganges, and the entire strength of the party was concentrated on the principal triangulation, the amount of secondary points fixed during the second season is far below that of the first season's work; nevertheless the chief towns and villages in the vicinity of the principal stations were fixed, and the secondary operations may be summarized as follows, consecutively with those before mentioned.

Eighthly. As soon as his work on the approximate series was finished, Mr. Mulheran carried a minor series with a 12-inch theodolite, 27 miles eastward from the side Marár-Newáda of the main series, to Jaunpur, by which a number of permanent buildings in and about that city were fixed.

Ninthly. Some minor triangulation was done, principally with a 7-inch theodolite, in and about the ancient city of Oudh (Ajodhya) and its modern successor Fyzabad, by which the chief landmarks were fixed, and also some buildings along the banks of the river Gogra or Sarju.

Tenthly. For topographical purposes, the position of 257 villages was determined in the course of the two seasons' work under notice, by observations made to them with the theodolite from one station, the distance being measured by the perambulator. As these determinations were only approximate they do not find a place in the Synoptical Volume of this Series.

In addition to the foregoing, an extensive chain of minor triangles appears on the chart of the Series along the river Gogra. This minor triangulation crosses the Gurwáni Series along the side Bisaul-Orejhár (XXIII-XXIV) with which it is connected. It was done six years subsequently, in 1852-53, by Mr. Belletty with a 12-inch theodolite and a party detached from the Huríláong Series. The details of this work (the Gogra Minor Series), between its stations No. 113 and No. 165 are now published as a portion of the Gurwáni Series, after having been adjusted to fit in duly between the adopted position-values of the undermentioned principal stations, as follows:—

Nos. 113 to 135 between Barhiáchak of the Gora Series (the next meridional series to the eastward) and Bisaul of this (the Gurwáni) Series; Nos. 136 to 142 between Bisaul and Orejhár, both of this Series; and finally, Nos. 143 to 165, forming a part of the section fitted in between Orejhár and Mási of the N. E. Longitudinal Series.

June 1881.

B. R. BRANFILL.

GURWANI MERIDIONAL SERIES.

ALPHABETICAL LIST OF STATIONS.

Bansídíla (of North-East Longitudinal Series).	XLV.	Murchía	I.
Barípúr	VII.	Nansa	XXI.
Birna	X.	Newa	XVI.
Bisaol	XXIII.	Newáda	XIII.
Chapri (of Calcutta Longitudinal Series).	XXIX.	Orájar	XXIV.
Dopáp	XVII.	Parípúra	XIV.
Ganespúr	VIII.	Pokra (of Calcutta Longitudinal Series).	XXXI.
Gurunagar	XXX.	Ráhet	XXII.
Jamaora	III.	Rámápúra	XII.
Kaprádi	XIX.	Raraoli	XX.
Kasda	II.	Sabánjot	XXVII.
Katra	IV.	Saibara (of North-East Longitudinal Series).	XLIII.
Kopa	XXVIII.	Saifábád	XV.
Kumería	XXV.	Seona	IX.
Mánápára	XXIX.	Sirwára	XVIII.
Marár	XI.	Tikería	XXVI.
Mega	VI.	Tikor	V.

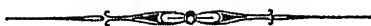
GURWANI MERIDIONAL SERIES.

NUMERICAL LIST OF STATIONS.

XXIX	.	.	.	Chapri.	XVI	.	.	.	.	Newa.
	.	.	.	(of Calcutta Longitudinal Series).		.	.	.	.
XXXI	.	.	.	Pokra.	XVII	.	.	.	.	Dopáp.
	.	.	.	(of Calcutta Longitudinal Series).		.	.	.	.
I	.	.	.	Murchía.	XVIII	.	.	.	.	Sirwára.
II	.	.	.	Kasda.	XIX	.	.	.	.	Kaprádi.
III	.	.	.	Jamaora.	XX	.	.	.	.	Raraoli.
IV	.	.	.	Katra.	XXI	.	.	.	.	Nansa.
V	.	.	.	Tikor.	XXII	.	.	.	.	Ráhet.
VI	.	.	.	Mega.	XXIII	.	.	.	.	Bisaol.
VII	.	.	.	Barípúr.	XXIV	.	.	.	.	Orájar.
VIII	.	.	.	Ganespúr.	XXV	.	.	.	.	Kumería.
IX	.	.	.	Seona.	XXVI	.	.	.	.	Tikería.
X	.	.	.	Birna.	XXVII	.	.	.	.	Sabánjot.
XI	.	.	.	Marár.	XXVIII	.	.	.	.	Kopa.
XII	.	.	.	Rámápúra.	XXIX	.	.	.	.	Mánápára.
XIII	.	.	.	Newáda.	XXX	.	.	.	.	Gurunagar.
XIV	.	.	.	Parípúra.	XLV	.	.	.	.	Bansídíla.
XV	.	.	.	Saifábád.		.	.	.	.	(of North-East Longitudinal Series).
					XLIII	.	.	.	.	Saibara.
						.	.	.	.	(of North-East Longitudinal Series).

GURWANI MERIDIONAL SERIES.

DESCRIPTION OF PRINCIPAL STATIONS.



Of the 30 Principal Stations composing this Series, the 6 southernmost, as also the 2 initial stations, are on hills: each consists either of a solid platform (of rubble stone and earth) varying in height from 3 to 8 feet and carrying a mark at the upper surface corresponding with one or more marks below, or of a circular tower (of rubble stone and earth) enclosing a central solid pillar in which are inserted several mark-stones each carrying a circle and centre adjusted in the normal of the lowest which is at the base of the pillar. When the Series entered on the plains, suitable artificial elevations had to be constructed, as usual, to admit of overlooking the curvature of the earth. Each of these structures consisted of a circular earthen tower of about 20 feet diameter at base and 16 feet diameter at top, enclosing a central solid pillar of masonry. The pillars consisted of rectangular blocks of masonry about 8 or 10 feet in height, surmounting one another, each succeeding block being contracted, so as to leave a plinth of some 6 inches around its base: the uppermost block, for the theodolite to stand on, was made cylindrical; it had a diameter of about $3\frac{1}{2}$ feet and was surrounded by a hollow annulus, so that it stood isolated from the tower on which the observatory tent was erected. In respect to mark-stones with the usual circle and central dot engraved, each pillar had one on its summit, besides generally another in its base, with one or more in addition fixed intermediately: also pairs of lines, intersecting one another in the normal through these central dots, were cut on the plinths or on the faces of the pillar, to provide the means of recovering the position of a dot in case of injury to the mark-stone on which it was engraved. An earthen staircase 4 feet wide and extending some 30 feet around the tower gave access to its summit, and the structure was further supported by a buttress of loose earth carried up to rather more than half its height.

The following descriptions have been compiled from those given in the MS. General Report and other original records of this Series, supplemented in respect to the neighbouring villages by information obtained from the Revenue and Topographical Survey maps of the country traversed. The information as to the local subdivisions in which the several stations occur has been derived from the latest Annual Reports received from the District Officers to whose charge the stations have been committed.

XXIX.—(*Of the Calcutta Longitudinal Series*). Chapri Hill Station, lat. $24^{\circ} 19'$, long. $82^{\circ} 16'$ —observed at in 1828, 1846 and 1865—is on a small hill about $1\frac{1}{2}$ miles S.W. of the village of Chapri: taluka Singrauli of the Rewah territories.

The pillar is solid and contains two marks, the upper 3.25 feet above the lower which is engraved on the rock *in situ*, having been placed there in 1828. The station was revisited in 1846 for the purpose of originating the Gurwani Meridional Series when no alteration appears to have been made. On again visiting it in 1865, the upper mark-stone of the former station was found undisturbed, but a new pillar was then built to the same height as before. The distances and bearings of the surrounding villages are:—Charki, 1 mile S.E.; Kanauli, $2\frac{1}{4}$ miles S.S.W.; Marua, nearly 3 miles N.W. by W.; and Khursa, $2\frac{1}{4}$ miles N. by W.

XXXI.—(*Of the Calcutta Longitudinal Series*). Pokra Hill Station, lat. $24^{\circ} 19'$, long. $82^{\circ} 31'$ —observed at in 1828, 1846 and 1865—is on a conspicuous peak in the midst of a mass of hills densely covered with forest, and distant about 2 miles N.W. of the small village of Pokra: taluka Bardi of the Rewah territories.

The pillar is solid and contains two marks, the upper 2.92 feet above the lower which is engraved on a square cut stone imbedded in the earth. The station was revisited in 1846 for the purpose of originating the Gurwani Meridional Series, but no alteration in construction appears to have been then made. On again visiting it in 1865, the mark-stone of the former station was found undisturbed, but a new pillar was then built to the same height as before. The distances and bearings of the surrounding villages are:—Pariasi, about $1\frac{1}{4}$ miles S.; Garwani, $3\frac{1}{2}$ miles N.W.; and Pachwar, $1\frac{1}{2}$ miles N.E.

I. Murchia (*Murchia*) Hill Station, lat. $24^{\circ} 35'$, long. $82^{\circ} 23'$ —observed at in 1846—is situated on a rocky eminence (so called) of the Kaimur range which overhangs the Son river and forms its northern watershed; it stands on the lands of the village of Jerauha: pargana Rewah of the Rewah territories.

The station consists of a platform (of rubble stone and earth) 8.2 feet high and about 14 feet in diameter; it has a mark engraved on the rock *in situ*, a mark-stone fixed in its upper surface, and two others inserted in it at 6.8 and 7.7 feet respectively above the lowest mark. The distances and bearings of adjacent places are:—Parsia, from which there is an easy road to the station, about 3 miles N.; Khairi-Ghat, the only pass in this vicinity which is practicable for laden animals, $1\frac{1}{2}$ miles W.N.W.; and Dhakor village, $1\frac{1}{4}$ miles S. by E.

II. Kasda Hill Station, lat. $24^{\circ} 34'$, long. $82^{\circ} 39'$ —observed at in 1846—is situated on a rocky eminence of the Kaimur range which overhangs the Son river and forms its northern watershed: tahsil Bardi of the Rewah territories.

The station consists of a platform (of rubble stone and earth) 9 feet high and 14 feet in diameter; it has a mark engraved on the rock *in situ*, a mark-stone fixed in its upper surface, and two others inserted in it intermediately. The distances and bearings of the surrounding villages are:—Bara, $1\frac{1}{4}$ miles S.S.W.; Keotili, $2\frac{1}{4}$ miles E.; Kasda W.N.W., $1\frac{1}{2}$ miles; and Jhondawal, about $5\frac{1}{2}$ miles N.N.E.

III. Jamaura (*Jamaora*) Hill Station, lat. $24^{\circ} 54'$, long. $82^{\circ} 30'$ —observed at in 1846—is situated on high ground distant about $1\frac{1}{2}$ miles E.N.E. of the village of Jamaura: thana Lalganj, tappa Upraudh, tahsil and district Mirzapur.

The station consists of a platform (of rubble stone and earth) 8 feet high and about 14 feet in diameter: it has a mark-stone at top, and two others at 2.2 and 3.6 feet respectively below it. The distances and bearings of surrounding villages are:—Ghura Khand, $2\frac{1}{2}$ miles W.; and Burshon, 2 miles E.

IV. Katra Hill Station, lat. $24^{\circ} 51'$, long. $82^{\circ} 12'$ —observed at in 1846—is situated on the heights 3 miles S. of the village of Katra sometimes also called Drummondganj; thana Lalganj, tappa Upraudh, tahsil and district Mirzapur.

The station consists of a circular tower of rubble stone and earth 16 feet in diameter, enclosing a central isolated pillar 6 feet high (of the same materials) having a mark-stone at top, and others at 3.8 and 5.3 feet respectively above the lowest mark which is engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Bhesaund, $1\frac{1}{2}$ miles E.N.E.; Lohriadar, $2\frac{1}{4}$ miles W. by N.; and Karampur, $2\frac{1}{4}$ miles S. by E.

V. Tikor Hill Station, lat. $25^{\circ} 4'$, long. $82^{\circ} 22'$ —observed at in 1846—is situated on one of the low heights $\frac{1}{4}$ of a mile S.W. by W. of the village of Tikor: thana Bindhachal, tappa Chhianue, tahsil and district Mirzapur.

The station consists of a circular tower (of rubble stone and earth)—with diameters at top and bottom, respectively, of 18 and 22 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 6, 12 and 16 feet respectively above it. The distances and bearings of surrounding villages are:—Dhuri, 1 mile W. by S.; Neoriha, 1 mile S. by E.; and Mara or Manda, $3\frac{1}{2}$ miles N.W. by W.

VI. Meja (*Mega*) Hill Station, lat. $25^{\circ} 7'$, long. $82^{\circ} 9'$ —observed at in 1846—is situated on a low height about $1\frac{1}{2}$ miles S. of the town of Meja, in the lands of the village of Basaira from which it is distant 2 miles N.: thana and tahsil Meja, pargana Khairagarh, district Allahabad.

The station consists of a platform (of rubble stone and earth) 8.2 feet high and 18 feet in diameter: it has a mark-stone at top, and others at 1.6 and 3 feet respectively below it. The distances and bearings of surrounding villages are:—Gunaigharpur, $2\frac{1}{4}$ miles N.N.E.; and Sikri, $2\frac{1}{2}$ miles S.W.

VII. Baripur (*Barīpur*) Tower Station, lat. $25^{\circ} 17'$, long. $82^{\circ} 20'$ —observed at in 1846—is situated at 250 yards from the N. bank of the Ganges, and about $\frac{1}{2}$ a mile E. of the village of Baripur Khás: thána Sháhganj, tahsíl Korh, pargana Bhadohi, district Mirzapur.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 10, 19 and 27 feet respectively above the latter. The distances and bearings of surrounding villages are:—Baripur Nárípur, on the N. bank of the Ganges, $1\frac{1}{4}$ miles W. by S.; Phútwaría, $\frac{3}{4}$ mile E.; and Bankat Khás, $1\frac{1}{4}$ miles N.E.

VIII. Ganeshpur (*Ganespur*) Tower Station, lat. $25^{\circ} 20'$, long. $82^{\circ} 8'$ —observed at in 1846—is situated on a spot elevated about 10 feet above the level of the surrounding country, close to and S.E. of the village of Ganeshpur: thána Handia, pargana Kiwái, district Allahabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 10, 19 and 27 feet respectively above the latter. The distances and bearings of surrounding places are:—The old fort of Amlauti, $3\frac{3}{4}$ miles E. by S.; Misrain, $1\frac{1}{4}$ miles N.N.E.; and Dumduma, 1 mile S.S.W.

IX. Seona Tower Station, lat. $25^{\circ} 28'$, long. $82^{\circ} 19'$ —observed at in 1846—is situated on a spot elevated about 12 feet above the level of the surrounding country, and distant 200 yards W. of village of Seona: thána and tahsíl Handia, pargana Mah, district Allahabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry 23 feet high which has a mark-stone at top, another at bottom, and others at 8, 15 and 21 feet respectively above the latter. The distances and bearings of surrounding places are:—The town of Kiwái, $4\frac{1}{2}$ miles S.E.; Ghulwa, $\frac{1}{2}$ mile W. by S.; Kundi, 1 mile E.; and Misrúr, $\frac{1}{2}$ mile S.

X. Birua (*Birna*) Tower Station, lat. $25^{\circ} 31'$, long. $82^{\circ} 7'$ —observed at in 1846 and 1847—is situated on a mound of saltpetre works elevated about 10 feet above the plain, and is nearly $\frac{1}{2}$ a mile N. W. of Birua or Pír Kází village: thána Phúlpur, pargana Sikandra, district Allahabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 10, 19 and 27 feet respectively above the latter. The distances and bearings of surrounding places are:—Mustafabad village, $1\frac{1}{2}$ miles W.; Míapura village, $1\frac{1}{4}$ miles E. by N.; and Phúlpur town, about $2\frac{1}{4}$ miles N.E. by N.

XI. Marár Tower Station, lat. $25^{\circ} 41'$, long. $82^{\circ} 17'$ —observed at in 1846 and 1847—is situated on a mound elevated about 60 feet above the level of the surrounding plain, and is distant about 350 yards N.E. of the village of Marár Díh: thána Mungra Bádsháhpur, tahsíl Machlishahr, pargana Mungra, district Jaunpur.

The station consists of an earthen tower enclosing a central solid pillar of masonry 19 feet high which has a mark-stone at top, another at bottom, and others at 7, 13 and 18 feet respectively above the latter. The distances and bearings of surrounding places are:—Rámnagar village, $2\frac{1}{4}$ miles W.N.W.; Naráinpur village, $1\frac{1}{2}$ miles N.E.; Umrganj village, 1 mile E. by S.; and the town of Bádsháhpur, 3 miles S.W.

XII. Rámapura (*Rámápurá*) Tower Station, lat. $25^{\circ} 45'$, long. $82^{\circ} 8'$ —observed at in 1847—is situated on an ancient village site elevated about 13 feet above the level of the surrounding country, and about $\frac{1}{2}$ a mile N. of the village of Rámapura: thána Rániganj, tahsíl Patti, district Partabgarh.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 14, 19 and 22 feet respectively above the latter. The distances and bearings of surrounding villages are:—Kaulapur, $\frac{1}{2}$ mile N. by E.; Bhawánigarh, $1\frac{1}{4}$ miles S. by W.; and Gaura, $1\frac{1}{2}$ miles E. by S.

XIII. Newáda Tower Station, lat. $25^{\circ} 50'$, long. $82^{\circ} 18'$ —observed at in 1847—is situated at about $\frac{1}{2}$ mile S. W. of the village of Newáda, and stands at a distance of about 1 mile S. of the old fort of Dáúdpur: thána and tahsíl Patti, district Partabgarh.

The station consists of an earthen tower enclosing a central pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding places are:—Kotani village, $\frac{1}{2}$ mile E.S.E.; Bábuganj village, $\frac{3}{4}$ mile S.E.; and the town of Bladeora, about $4\frac{1}{2}$ miles N.W. by W.

XIV. *Parípara* (*Parípúra*) Tower Station, lat. $25^{\circ} 55'$, long. $82^{\circ} 9'$ —observed at in 1847—is situated on the bank of a tank in the lands of the village of *Parípara*; it stands at a distance of about 2 miles N.N.E. of the great bend in the Sai river, and $\frac{1}{2}$ mile S. of the high road from *Patti* to *Partabgarh*: *thána* and *tahsíl Patti*, district *Partabgarh*.

The station consists of an earthen tower enclosing a central solid pillar of masonry 20 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding places are :—*Jaisingarh* fort, 1 mile S.E.; *Khojikalán* village, 1 mile S.W. by W.; and *Púra Pande* village, about $\frac{3}{4}$ mile N.N.W.

XV. *Saifabad* (*Saifábád*) Tower Station, lat. $26^{\circ} 1'$, long. $82^{\circ} 19'$ —observed at in 1847—is situated on the N. E. angle of an old fort in the lands of the village of *Saifabad*, and is elevated about 27 feet above the level of the surrounding country: *thána* and *tahsíl Patti*, district *Partabgarh*.

The station consists of an earthen tower enclosing a central solid pillar 12 feet high which has a mark-stone at top, another at bottom, and a third at 4 feet above the latter. The distances and bearings of surrounding villages are :—*Dhansar*, $\frac{3}{4}$ mile E.S.E.; *Jehanabad*, nearly 1 mile N.W.; and *Naurangabad*, $\frac{1}{2}$ mile N. by W.

XVI. *Newa* Tower Station, lat. $26^{\circ} 6'$, long. $82^{\circ} 10'$ —observed at in 1847—is situated in the vicinity of the village of *Newa*, and stands on a site elevated about 10 feet above the level of the surrounding country which is much intersected by tanks and swamps: *thána Lamhwa*, *tahsíl Kádipur*, *pargana Chánda*, district *Sultanpur*.

The station consists of an earthen tower enclosing a central solid pillar of masonry 26 feet high which has a mark-stone at top, another at bottom, and others at 8, 16 and 24 feet respectively above the latter. The distances and bearings of surrounding villages are :—*Sheogarh*, 1 mile E.N.E.; *Sansáripur*, about $\frac{1}{2}$ mile N.W.; and *Kaithapur*, nearly $1\frac{1}{2}$ miles S. by E.

XVII. *Dopáp* Tower Station, lat. $26^{\circ} 11'$, long. $82^{\circ} 19'$ —observed at in 1847—is situated in the village of *Dopáp*, and stands in the centre of an old ruined fort, the eastern face of which is washed by the *Gumti* river: *thána Lamhwa*, *pargana Chánda*, district *Sultanpur*.

The station consists of an earthen platform enclosing a central solid pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding villages are :—*Lotia*, $\frac{1}{4}$ mile S. by E.; *Mungapur*, nearly 1 mile W.; and *Sukhauli*, about a mile N.N.W.

XVIII. *Sirwára* Tower Station, lat. $26^{\circ} 16'$, long. $82^{\circ} 10'$ —observed at in 1847—is situated at rather less than half a mile S.E. of the village of *Sirwára*, and stands on the W. side of a small tank distant about $\frac{1}{2}$ mile from the left bank of the *Gumti* river: *thána* and *tahsíl Sultanpur*, *pargana Baraunsa*, district *Sultanpur*.

The station consists of an earthen tower enclosing a central solid pillar of masonry 28 feet high which has a mark-stone at top, another at bottom, and others at 8, 16, 20 and 24 feet respectively above the latter. The distances and bearings of surrounding places are :—The minarets of *Sultanpur*, $2\frac{1}{2}$ miles W.N.W.; *Bhikhapur* temple, $\frac{1}{4}$ mile S.W.; *Fatehpur* village, nearly 1 mile E.; and *Itkauli* village, about 1 mile N. by E.

XIX. *Kapradi* (*Kaprádi*) Tower Station, lat. $26^{\circ} 22'$, long. $82^{\circ} 19'$ —observed at in 1847—is situated at $\frac{1}{4}$ mile S. E. of the village of *Kapradi*, and stands on the site of an ancient village which is elevated about 16 feet above the level of the surrounding country: *thána Kurai-bhár*, *tahsíl Sultanpur*, *pargana Baraunsa*, district *Sultanpur*.

The station consists of an earthen tower enclosing a central solid pillar of masonry $25\frac{1}{2}$ feet high which has a mark-stone at top, another at bottom, and others at 8, 12, 15 and 20 feet above the latter. The distances and bearings of surrounding villages are :—*Gurbár*, nearly $\frac{1}{2}$ mile N.; *Mahmúdpur*, $\frac{3}{4}$ mile E.S.E.; *Dubepurwa*, $\frac{3}{4}$ mile S.; and *Rámnáthpur*, $\frac{1}{2}$ mile N.N.W.

XX. *Rarauli* (*Raraoli*) Tower Station, lat. $26^{\circ} 27'$, long. $82^{\circ} 11'$ —observed at in 1847—is situated at about 300 yards W.S.W. of the village of *Rarauli*, and stands on the N. bank of a tank: *tahsíl Bikapur*, *pargana Pachhimráth*, district *Fyzabad*.

The station consists of an earthen tower enclosing a central solid pillar of masonry 32 feet high which has a mark-stone at top, another at bottom, and others at 8, 16 and 24 feet respectively above the latter. The distances and bearings of surrounding villages are :—*Saidkhánpur*, $1\frac{1}{4}$ miles W.S.W.; *Jagdispur*, 1 mile N.E.; *Athgaon*, 1 mile E. by S.; and *Umráth*, 1 mile S. by W.

XXI. Nansa Tower Station, lat. $26^{\circ} 32'$, long. $82^{\circ} 20'$ —observed at in 1847—is situated within the village of Nansa, and stands at the S. W. angle of the fort. The Madha river flows at a distance of $3\frac{1}{2}$ miles N., and the Bisúhi at 3 miles S. of the station: tahsíl Bīkapur, pargana Pāchhimráth, district Fyzabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry (height not forthcoming) which has a mark-stone at top, and others—it is assumed—built into the tower as in the adjacent stations. The distances and bearings of surrounding villages are:—Bakhtipur, over $\frac{1}{4}$ mile W. by N.; Bhaisauli, 1 mile N.E.; Dhaurahra, $1\frac{1}{4}$ miles S.E.; and Jadopur, $1\frac{1}{2}$ miles S.S.W.

XXII. Ráhet Tower Station, lat. $26^{\circ} 37'$, long. $82^{\circ} 11'$ —observed at in 1847—is situated about 250 yards S. by W. of the village of Ráhet, and stands on a site that is elevated about 16 feet above the level of the surrounding country. One of the main channels of the Madha river is nearly $\frac{1}{4}$ of a mile N. of the station: thána and tahsíl Bīkapur, pargana Pāchhimráth, district Fyzabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry $25\frac{1}{4}$ feet high which has a mark-stone at top, another at bottom, and others at 8, 12 and 16 feet respectively above the latter. The distances and bearings of surrounding places are:—Ruknuddīnpur village, $\frac{3}{4}$ mile S.S.E.; Dashratpur village, $\frac{1}{2}$ mile N.E.; and the town of Bhadarsa, 2 miles N.W.

XXIII. Bisaul (*Bisaol*) Tower Station, lat. $26^{\circ} 41'$, long. $82^{\circ} 23'$ —observed at in 1847—is situated just within the boundary of the village of Bisaul, and is distant about half a mile from the right bank of the Gogra river: thána Mahárājganj, tahsíl Fyzabad, pargana Amsin, district Fyzabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding villages are:—Isa Saráe, nearly $\frac{1}{4}$ mile N.N.W.; Raipur, nearly 1 mile E.S.E.; and Jurhi, about $1\frac{1}{2}$ miles S.W.

XXIV. Orejhár (*Orájar*) Station, lat. $26^{\circ} 47'$, long. $82^{\circ} 15'$ —observed at in 1847—is situated in the southern suburbs of the city of Ajodhya, and stands on a conical hill (about 80 feet in height) named Orejhár from the circumstance—as is said—of its having been formed by the deposit of rubbish removed from the city. Towards the N.W. of the station is some high ground raised about 60 feet above the level of the surrounding country: this is said to be the site of the ancient city; it is now occupied as a burial ground, and has a secondary station fixed on it. The station is in thána and tahsíl Fyzabad, pargana Ajodhya, district Fyzabad.

The station consists of an earthen platform enclosing a central solid pillar of masonry, which is carried up to a height of 8 feet above ground level, and has a mark-stone at top, and others at 4, 8 and 10 feet respectively below this surface. The distances and bearings of surrounding places are:—The city of Ajodhya, $1\frac{1}{2}$ miles N.; the town of Fyzabad, nearly 3 miles W. by S.; and the village of Barchta, about $\frac{1}{2}$ mile N.E.

XXV. Kumeria (*Kumeria*) Tower Station, lat. $26^{\circ} 52'$, long. $82^{\circ} 35'$ —observed at in 1847—is situated at the S.W. angle of the village of Kumeria, and stands on a spot elevated 30 feet above the level of the surrounding country. The Manwar river winds round at the distance of a mile to the S.W. of the station: thána Parsrámpur, pargana Amorha, district Basti.

The station consists of an earthen tower enclosing a central solid pillar of masonry 27 feet high which has a mark-stone at top, another at bottom, and others at 8, 16 and 24 feet respectively above the latter. The distances and bearings of surrounding villages are:—Jagdīspur, $1\frac{1}{4}$ miles W.N.W.; Nipania, nearly $\frac{3}{4}$ mile S. by W.; Basewa, $\frac{3}{4}$ mile E.S.E.; and Kurmia, $\frac{1}{2}$ mile N.N.E.

XXVI. Tikeria (*Tikeria*) Tower Station, lat. $26^{\circ} 57'$, long. $82^{\circ} 16'$ —observed at in 1847—is situated in the lands of the Debinagar Grant, and stands on high ground about 250 yards from the right bank of the Chamnai river: thána Wazīrganj, pargana Nawabganj, district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 26 feet high which has a mark-stone at top, another at bottom, and others at 8, 16 and 20 feet respectively above the latter. The distances and bearings of surrounding villages are:—Jánkinagar, $1\frac{1}{2}$ miles N.E.; Saráe, $1\frac{1}{2}$ miles S.S.W.; Jalmalpur, $1\frac{1}{4}$ miles W.S.W.; and Rámgarh, $1\frac{1}{4}$ miles N.N.W.

XXVII. Sabanjot (*Sabánjot*) Tower Station, lat. $27^{\circ} 3'$, long. $82^{\circ} 26'$ —observed at in 1847—is situated in the village of that name which lies in the low marshy ground skirting the N. bank of the Bisúhi river: thána and tahsíl Utraula, pargana Sadullahnagar, district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 32 feet high which has a mark-stone at top, another at bottom, and others at 9, 18 and 26 feet respectively above the latter. The distances and bearings of surrounding villages are:—Chandaugot, $\frac{1}{2}$ mile N. by W.; Kakarghatta, about a mile W.S.W.; and Singarghat, nearly $\frac{3}{4}$ mile S.E.

XXVIII. Kopa Tower Station, lat. $27^{\circ} 7'$, long. $82^{\circ} 15'$ —observed at in 1847—is situated at $\frac{1}{4}$ of a mile S.S.E. of Kopa village, and stands on a site elevated about 11 feet above the level of the surrounding country: it is about $2\frac{1}{2}$ miles S.W. of the Bisúhi and nearly the same distance N. of the Manwar river: thána Intwa, pargana Manikapur, district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 20 feet high which has a mark-stone at top, another at bottom, and others at 7 and 14 feet respectively above the latter. The distances and bearings of surrounding villages are:—Dhuswa Khás, 1 mile S.; Karnapur, $\frac{3}{4}$ mile N.N.E.; and Jigna, $1\frac{1}{4}$ miles W.

XXIX. Mánapára (*Mánápára*) Tower Station, lat. $27^{\circ} 13'$, long. $82^{\circ} 22'$ —observed at in 1847—is situated in the lands of Jafrabad village, and stands on an elevation (12 feet high) in low, densely wooded, marshy ground at a distance of 220 yards N. of the Kuwána river: thána, tahsíl and pargana Utraula, district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 9, 18 and 26 feet respectively above the latter. The distances and bearings of surrounding villages are:—Mahmúdnagar, nearly $1\frac{1}{2}$ miles N.; Bhur, $1\frac{1}{2}$ miles W.S.W.; and Mudui Khán, $1\frac{1}{2}$ miles E.S.E.

XXX. Gurúnagar (*Gurunagar*) Tower Station, lat. $27^{\circ} 18'$, long. $82^{\circ} 11'$ —observed at in 1847—is situated about $\frac{1}{2}$ mile N.N.E., of Gurúnagar village, and stands on a slight elevation very close to the S. bank of the Pirári, an affluent of the Kuwána river: thána Aiah, tahsíl, pargana and district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding villages are:—Madhnagar, about $\frac{3}{4}$ mile S.W.; Bardand, $1\frac{1}{4}$ miles W. by N.; Naktapur, 1 mile S.S.E.; and Sumda, $1\frac{1}{2}$ miles E. by S.

XLIII.—(*Of the North-East Longitudinal Series*). Saibara Tower Station, lat. $27^{\circ} 27'$, long. $82^{\circ} 8'$ —observed at in 1847 and 1849—is situated about 300 yards N.W. of the village of Saibara, and at the N.W. angle of a square tank: thána and pargana Balrámpur, district Gonda.

The station as built in 1847 consists of an earthen tower enclosing a central solid pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The station was revisited in 1849 in the course of the North-East Longitudinal Series operations but no alteration in its construction appears to have been then made. The distances and bearings of surrounding villages are:—Duária, $\frac{1}{2}$ mile N.N.W.; Gidhuraia, about $1\frac{1}{2}$ miles N.E.; Sharúpur, $1\frac{1}{2}$ miles S.E. by E.; and Buráepur, $\frac{3}{4}$ mile W.

XLV.—(*Of the North-East Longitudinal Series*). Bansídila Tower Station, lat. $27^{\circ} 24'$, long. $82^{\circ} 19'$ —observed at in 1847 and 1849—is situated about 200 yards S.W. of the village of Bansídila, and stands on the site of an ancient village elevated about 18 feet above the level of the country. The land to the north of the station is much intersected by streams and tanks, and the river Rapti flows about $1\frac{1}{4}$ miles to the N.: thána and pargana Balrámpur, district Gonda.

The station as built in 1847 consists of an earthen tower enclosing a central solid pillar of masonry 20 feet high which has a mark-stone at top, another at bottom, and others at 7 and 13 or 14 feet respectively above the latter. The station was revisited in 1849 in the course of the North-East Longitudinal Series operations but no alteration in its construction appears to have been then made. The distances and bearings of surrounding villages are:—Firozpur, $\frac{1}{4}$ mile S. by W.; Bhagwatpur, 1 mile N.W.; Tendúa, 1 mile N.E.; and Pursea, 1 mile E.S.E.

NOTE.—In a few instances the names of principal stations, occurring in the foregoing descriptions, are given by two methods of spelling, distinguished from one another by the use of Roman and Italic type; as in I. Murchia (*Murchia*): the latter spelling is taken from the Alphabetical and Numerical lists, which precede the descriptions and which were printed in 1869: the spelling in Roman type is in accordance with the method authorized by the Government and illustrated in lists of Indian proper names published in 1874 and subsequently. It will be seen that the two methods differ but slightly; notwithstanding, where differences exist, both renderings are given, so as to remove all possible doubt as to the identity of a station. The method of spelling authorized by the Government, is hereafter exclusively adopted in the publication of this Series.

February 1879.

J. B. N. HENNESSEY,
In charge of Computing Office.

GURWANI MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Condition of the Station
XXIX	Chapri	Baghelkhand, Rewah State	Táluka Singrauli	Chapri	...
XXXI	Pokra	"	Táluka Bardi	Pokra	...
I	Murchia	"	P. Rewah	Jerauha	...
II	...	"	Tah. Bardi	Kista	...
III	Jamaura	Mirzapur	Thá. Lálganj, Tappa Upraudh, Tah. Mirzapur	Jamaura	...
IV	Katra	"	Ditto.	Mahágarhi	...
V	Tikor	"	Thá. Bindháchal, Tappa Chhiánue, Tah. Mirzapur	Tikor	Tower fallen down on all sides as reported in 1872.
VI	...	Allahabad	Thá. and Tah. Meja, P. Khairagarh, Táluka Daiya	Basaira	Upper mark-stone missing as reported in 1867.
VII	Barípur	Mirzapur	Thá. Sujanganj, P. Bhadohi, Tah. Korh	Kurwa Barípur	Half of the pillar fallen down as reported in 1867.
VIII	...	Allahabad	Thá. and Tah. Handia, P. Kiwái, Táluka Mawaiya	Ganeshipur	Upper mark-stone missing as reported in 1867.
IX	...	"	Thá. and Tah. Handia, P. Mah, Táluka Masudhi	Seona	Ditto.

NOTE.—Stations XXIX and XXXI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. and Thá. for thána.

P. stands for pargana, Tah. for tahsíl,

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Condition of the Station
X	...	Allahabad	Thá. and Tah. Phúlpur, P. Sikandra	Pír Kázi <i>alias</i> Birua	Upper mark-stone missing as reported in 1867.
XI	Marárdi	Jaunpur	Thá. Mungra Bádsháhpur, P. Mungra	Marárdíh	... ..
XII	Rámapur	Partabgarh	Thá. Rániganj, P. and Tah. Patti, Táluka Raepur Bichu	Rámpur	... ..
XIII	Newáda	"	Thá., Tah. and P. Patti, Táluka Saifabad	Newáda	Very dilapidated as reported in 1878.
XIV	Púra Pande	"	Ditto.	Púra Pande	... ..
XV	Saifabad	"	Ditto.	Saifabad	... ..
XVI	Durbín Minár	Sultanpur	Thá. Lamhwa, Tah. Kádipur, P. Chánda, Táluka Sheogarh	Newa	... ..
XVII	"	"	Thá. Lamhwa, Tah. Kádipur, P. Chánda, Táluka Sháhpur	Sháhpur	... ..
XVIII	"	"	Thá. and Tah. Sultanpur, P. Baraunsa	Sirwára	... ..
XIX	"	"	Thá. Kuraibhár, Tah. Sultanpur, P. Baraunsa, Táluka Dhannodi	Kapradi	... ..
XX	Rarauli	Fyzabad	Tah. Bikapur, Táluka Kurwar, P. Pachhimráth	Rarauli	... ..
XXI	Nansa	"	Tah. Bikapur, Táluka Sihipur, P. Pachhimráth	Nansa	Upper mark-stone missing as reported in 1878.
XXII	Ráhet	"	Thá. and Tah. Bikapur, P. Pachhimráth	Ráhet	... ..
XXIII	Dalpatpur	"	Thá. Mahárájganj, P. Amsin, Tah. Fyzabad, Táluka Sihipur	Bisaul	... ..
XXIV	Kázipur	"	Thá. and Tah. Fyzabad, P. Haveli	Orehár	... ..
XXV	...	Basti	Thá. Parsrámpur, Tah. Harraiya, P. Amorha.	Khamharia	Upper mark-stone missing as reported in 1867.
XXVI	Jungle Tikri	Gonda	Thá. Wazírganj, Tah. Begamganj, P. Nawabganj	Debinagar Grant	Much dilapidated as reported in 1875.
XXVII	Marung Sabanjot	"	P. and Táluka Sadullahnagar, Thá. and Tah. Utraula	Sabanjot	... ..

NOTE.—P. stands for pargana, Tah. for tahsil, and Thá. for thána.

PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

11*—*N.*

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Condition of the Station
XXVIII	Marung Kopa	Gonda	P. and Táluka Manika- pur, Thá. Etwah, Tah. Utraula	Kopa	...
XXIX	Marung Jáfra- bad	"	P., Táluka, Thá. and Tah. Utraula	Jáfrabad	...
XXX	Madhnagar	"	Táluka Singha Chanda, Thá. Aiah, P. and Tah. Gonda	Madhnagar	Pillar partially fallen down as report- ed in 1875.
XLIII	Sabaira	"	P. and Thá. Balrámpur, Tah. Utraula	Sabaira	...
XLV	Básadela	"	P., Thá. and Táluka Bal- rámpur, Tah. Utraula	Básadela	...

NOTE.—Stations XLIII and XLV appertain to the North-East Longitudinal Series.

P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

September, 1882.

J. B. N. HENNESSEY,
In charge of Computing Office.

GURWANI MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. TRIANGLES.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
1	Chapri, XXIX	.64	67 28 56.52	5.0248745	105894.8	20.056
	Pokra, XXXI	.63	66 27 40.54	5.0215846	105095.6	19.904
	Murchia, I	.63	46 3 22.94	4.9166608	82539.3	15.632
2	Pokra, XXXI	.64	48 31 53.31	4.9350090	86101.2	16.307
	Murchia, I	.65	64 18 37.82	5.0151422	103548.1	19.611
	Kasda, II	.65	67 9 28.87	5.0248745	105894.8	20.056
3	Murchia, I	.79	75 44 52.23	5.1101598	128872.4	24.408
	Kasda, II	.78	63 53 42.46	5.0770082	119401.1	22.614
	Jamaura, III	.78	40 21 25.31	4.9350090	86101.2	16.307
4	Murchia, I	.82	49 3 9.73	4.9891122	97524.1	18.470
	Jamaura, III	.82	63 19 1.52	5.0620825	115367.2	21.850
	Katra, IV	.82	67 37 48.75	5.0770082	119401.1	22.614
5	Jamaura, III	.52	66 12 54.64	4.9814924	95828.0	18.149
	Katra, IV	.52	45 9 8.11	4.8706758	74246.5	14.062
	Tikor, V	.53	68 37 57.25	4.9891122	97524.1	18.470

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Chapri, XXIX, and Pokra, XXXI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
6	Katra, IV	"	° ' "			
	Tikor, V	.52	43 18 33'84	4'8598534	72419'2	13'716
	Meja, VI	.52	71 30 23'28	5'0005416	100124'8	18'963
7	Tikor, V	.52	65 11 2'88	4'9814924	95828'0	18'149
	Meja, VI	.41	65 38 52'17	4'9104025	81358'4	15'409
	Baripur, VII	.40	60 9 55'49	4'8891229	77468'1	14'672
8	Meja, VI	.40	54 11 12'34	4'8598534	72419'2	13'716
	Baripur, VII	.38	49 28 32'63	4'8253800	66892'9	12'669
	Ganeshpur, VIII	.38	62 55 47'79	4'8941016	78361'3	14'841
9	Baripur, VII	.39	67 35 39'58	4'9104025	81358'4	15'409
	Ganeshpur, VIII	.33	64 40 41'88	4'8556215	71716'9	13'583
	Seona, IX	.32	57 51 2'70	4'8272027	67174'2	12'722
10	Ganeshpur, VIII	.32	57 28 15'42	4'8253800	66892'9	12'669
	Seona, IX	.33	58 16 47'61	4'8353606	68448'0	12'964
	Birua, X	.33	58 41 21'45	4'8372634	68748'5	13'021
11	Seona, IX	.34	63 1 50'94	4'8556215	71716'9	13'583
	Birua, X	.41	63 52 20'65	4'9112611	81519'4	15'439
	Marár, XI	.41	67 12 8'46	4'9227479	83704'3	15'853
12	Birua, X	.40	48 55 30'89	4'8353606	68448'0	12'964
	Marár, XI	.32	37 7 27'37	4'7181857	52262'0	9'898
	Rámapura, XII	.33	72 35 0'55	4'9170940	82621'7	15'648
13	Marár, XI	.32	70 17 32'08	4'9112611	81519'4	15'439
	Rámapura, XII	.22	70 30 12'93	4'7915805	61884'3	11'721
	Newáda, XIII	.21	56 44 17'60	4'7395207	54893'5	10'396
14	Rámapura, XII	.21	52 45 29'47	4'7181857	52262'0	9'898
	Newáda, XIII	.22	53 0 45'80	4'7313107	53865'5	10'202
	Paripura, XIV	.23	60 23 53'12	4'7681482	58633'8	11'105
15	Newáda, XIII	.23	66 35 21'08	4'7915805	61884'3	11'721
	Paripura, XIV	.26	67 25 10'85	4'8263499	67042'5	12'697
	Saifabad, XV	.26	64 41 24'00	4'8171594	65638'6	12'432
16	Paripura, XIV	.25	47 53 25'15	4'7313107	53865'5	10'202
	Saifabad, XV	.27	51 8 2'66	4'7619164	57798'5	10'947
	Newa, XVI	.27	64 17 29'19	4'8253235	66884'2	12'667
17	Saifabad, XV	.28	64 34 28'15	4'8263499	67042'5	12'697
	Newa, XVI	.24	62 54 39'51	4'7825129	60605'6	11'478
	Dopáp, XVII	.24	58 58 44'96	4'7659472	58337'4	11'049
18	Newa, XVI	.23	58 6 35'53	4'7619164	57798'5	10'947
	Dopáp, XVII	.26	57 44 40'65	4'7856091	61039'2	11'560
	Sirwára, XVIII	.27	65 9 0'24	4'8162085	65495'1	12'404
19	Dopáp, XVII	.26	57 6 19'11	4'7825129	60605'6	11'478
	Sirwára, XVIII	.25	53 5 11'22	4'7596977	57503'9	10'891
	Kapradi, XIX	.26	68 50 35'63	4'8265497	67073'3	12'703
20	Sirwára, XVIII	.26	58 4 13'15	4'7856091	61039'2	11'560
	Kapradi, XIX	.22	51 39 4'62	4'7254274	53140'7	10'065
	Rarauli, XX	.23	70 17 4'11	4'8047379	63787'8	12'081
		.23	58 3 51'27	4'7596977	57503'9	10'891

PRINCIPAL TRIANGULATION. TRIANGLES.

11—N.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle			Distance		
						Log. feet	Feet	Miles
21	Kapradi, XIX	"	°	'	"			
	Rarauli, XX	.22	60	33	2.01	4.7624172	57865.2	10.959
	Nansa, XXI	.22	66	20	54.96	4.7844008	60869.6	11.528
22	Rarauli, XX	.24	58	33	4.88	4.7662726	58381.2	11.057
	Nansa, XXI	.24	63	42	56.81	4.7878714	61358.0	11.621
	Ráhet, XXII	.23	57	43	58.31	4.7624172	57865.2	10.959
23	Nansa, XXI	.26	76	17	29.37	4.8527330	71241.5	13.493
	Ráhet, XXII	.25	50	56	44.09	4.7554522	56944.6	10.785
	Bisaul, XXIII	.25	52	45	46.54	4.7662726	58381.2	11.057
24	Ráhet, XXII	.28	53	42	17.96	4.7863774	61147.3	11.581
	Bisaul, XXIII	.28	56	24	20.21	4.8006854	63195.4	11.969
	Orejhar, XXIV	.29	69	53	21.83	4.8527330	71241.5	13.493
25	Bisaul, XXIII	.28	58	28	47.52	4.8003346	63144.4	11.959
	Orejhar, XXIV	.28	65	52	52.72	4.8299909	67606.9	12.804
	Kumeria, XXV	.27	55	38	19.76	4.7863774	61147.3	11.581
26	Orejhar, XXIV	.25	53	35	55.30	4.7603679	57592.8	10.908
	Kumeria, XXV	.26	64	27	36.04	4.8099801	64562.5	12.228
	Tikeria, XXVI	.26	61	56	28.66	4.8003346	63144.4	11.959
27	Kumeria, XXV	.26	56	10	23.13	4.7769339	59832.1	11.332
	Tikeria, XXVI	.26	70	43	54.87	4.8324426	67989.6	12.877
	Sabanjot, XXVII	.25	53	5	42.00	4.7603679	57592.8	10.908
28	Tikeria, XXVI	.25	62	53	18.42	4.7909867	61799.7	11.704
	Sabanjot, XXVII	.24	57	35	40.38	4.7680225	58616.9	11.102
	Kopa, XXVIII	.24	59	31	1.20	4.7769339	59832.1	11.332
29	Sabanjot, XXVII	.24	49	30	48.59	4.7286258	53533.5	10.139
	Kopa, XXVIII	.25	69	5	4.76	4.8178904	65749.2	12.452
	Mánapára, XXIX	.24	61	24	6.65	4.7909867	61799.7	11.704
30	Kopa, XXVIII	.26	63	57	24.33	4.8146677	65263.1	12.360
	Mánapára, XXIX	.26	68	34	5.10	4.8300483	67615.8	12.806
	Gurúnagar, XXX	.25	47	28	30.57	4.7286258	53533.5	10.139
31	Mánapára, XXIX	.27	52	38	53.92	4.7684804	58678.7	11.113
	Gurúnagar, XXX	.28	65	12	27.06	4.8261592	67013.0	12.692
	Bansídila, XLV	.27	62	8	39.02	4.8146677	65263.1	12.360
32	Gurúnagar, XXX	.25	65	10	36.38	4.8031378	63553.3	12.037
	Bansídila, XLV	.25	57	53	39.82	4.7731591	59314.3	11.234
	Saibara, XLIII	.24	56	55	43.80	4.7684804	58678.7	11.113

NOTE.—Stations Saibara, XLIII, and Bansídila, XLV appertain to the North-East Longitudinal Series.

August 1879.

J. B. N. HENNESSEY,

In charge of Computing Office.

GURWANI MERIDIONAL SERIES.

SECONDARY TRIANGULATION. TRIANGLES.

PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles	
33	Chapri, XXIX Pokra, XXXI Tendúa	h.s. 87 42 38	4° 76' 11.7 4° 99' 34.6 4° 91' 66.1	58765 99391 82539	11° 130 18° 824 15° 632	88	Pokra, XXXI Bargawa Panjerio Hill Mark	h.s. 42 52 33 78 6 17	4° 82' 68.15 4° 98' 46.15 4° 92' 197	67114 96520 84566	12° 711 18° 280 16° 016	Inch 18 "	
34	Pokra, XXXI Tendúa Bargawa*	h.s. 152 23 44	4° 44' 69.57 4° 92' 7197 4° 76' 91.17	27987 84566 58765	5° 301 16° 016 11° 130	39	Bargawa Dibar Bhawánpur†	h.s. 67 18 57 46 34 43	5° 21' 33.72 5° 20' 94.23 5° 10' 94.65	163445 161966 128666	30° 956 30° 675 24° 369	" " "	
35	Chapri, XXIX Pokra, XXXI Adhesar Hill Mark†	75 47 53 64 47 24	5° 100' 48.1 5° 07' 04.91 4° 91' 66.61	126032 117623 82539	23° 870 22° 277 15° 632	40	Bargawa Dibar Deopura	h.s. 41 46 0 89 22 43 48 51 17	5° 05' 61.83 5° 23' 26.19 5° 10' 94.65	113811 170852 128666	21° 555 32° 358 24° 369	" " "	
36	Pokra, XXXI Bargawa Dibar	h.s. 112 16 6 25 57 50	5° 10' 94.65 5° 25' 22.55 4° 92' 7197	128666 178754 84566	24° 369 33° 855 16° 016	41	Bargawa Bhawánpur Deopura	h.s. 25 32 57 70 30 34	4° 86' 98.16 5° 23' 26.19 5° 20' 94.23	74100 170852 161966	14° 034 32° 358 30° 675	" " "	
37	Bargawa Dibar Panjerio Hill Mark	h.s. 27 15 50	4° 91' 52.60 4° 82' 68.15 5° 10' 94.65	82273 67114 128666	15° 582 12° 711 24° 369	42	Bargawa Dibar Rájapur	h.s. 48 2 4 80 15 4 51 42 52	5° 08' 59.41 5° 20' 83.15 5° 10' 94.65	121882 161553 128666	23° 084 30° 597 24° 369	" " "	

* There are two more triangles to this station, see Nos. 83 and 84. Difference between the common side of triangles Nos. 34 and 84 is 6 feet.
† to this point, see Nos. 103 and 104.

Notes.—1. Names followed by Roman numerals are those of Principal Stations. Stations Chapri, XXIX, and Pokra, XXXI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.
2. The values of the side are given in the same line with the opposite angle.

SECONDARY TRIANGULATION. TRIANGLES.

13—N.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle used	Station	Corrected Plane Angle	Distance			No. of Triangle used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
43	Bargawa Bhawánipur Rájapur	h.s. " " "	19 16 53 80 47 23	4 733846 5 208315 5 209423	54181 161553 161906	18 30 597 30 675	h.s. " " "	56	92 34 31 39 35 47	4 854975 4 659809 4 725313	71610 45089 53127	13 563 8 653 10 062
44	Bhawánipur Deopura Pana	h.s. " " "	40 13 47	4 838632 4 694045 4 809810	68966 49436 74100	13 062 9 363 14 034	h.s. " " s.	57	78 25 19 55 8 29	4 825011 4 748032 4 694045	66836 55982 49436	12 658 10 603 9 363
45	Bhawánipur Rájapur Pana	h.s. " " "	51 59 15	4 765669 4 694045 4 733846	58300 49436 54181	11 042 9 363 10 262	h.s. " " "	58	19 33 56	4 638333 5 007805 4 838632	43484 101827 68906	8 236 19 286 13 062
46	Bhawánipur Pana Pándipura *	h.s. " " "	69 52 4 58 0 54 52 7 2	4 769440 4 725313 4 694045	58808 53127 49436	11 138 10 062 9 363	h.s. " " "	59	47 7 53	4 945450 5 076253 4 838632	88196 119194 68906	16 704 22 575 13 062
47	Bhawánipur Pándipura Dhanwáli Temple	h.s. " " "	36 45 36 19 17 15	4 583533 4 325415 4 725312	38330 21155 53127	7 259 4 007 10 062	h.s. " " "	60	51 30 45 13 52 30	4 950129 4 436366 5 015142	89151 27313 103548	16 885 5 173 19 611
48	Bhawánipur Pana Ganges River No. 45 +	h.s. " " "	65 42 40 72 29 24 41 47 56	4 829982 4 849629 4 694045	67605 70734 49436	12 804 13 397 9 363	h.s. " " "	61	17 7 30 40 10 7	4 460655 4 801218 4 916661	28884 63273 82539	5 470 11 064 15 032
49	Ganges River No. 45 Bhawánipur Mohári	h.s. " " "	75 52 43 13 13 9 90 54 8	4 866356 4 208904 4 849629	68605 16177 70734	12 993 3 064 13 397	h.s. " " "	62	104 30 51 36 2 55	5 117990 4 901802 4 935009	131217 79703 86101	24 852 15 107 16 307
50	Bhawánipur Pándipura Mohári	h.s. " " "	9 3 45	4 259638 4 836356 4 725313	18182 68605 53127	3 444 12 993 10 062	h.s. " " "	63	17 31 54 5 51 11	4 901802 4 431404 5 021585	79703 27003 105090	15 107 5 114 19 904
51	Rájapur Pana Kusáhi Temple	h.s. " " "	52 11 30	4 887172 4 989423 4 765669	77121 97594 58300	14 606 18 484 11 042	h.s. " " "	64	39 41 1 32 10 17	4 852220 4 773309 5 024875	71157 59335 105895	13 477 11 238 20 056
52	Ganges River No. 45 Bhawánipur Mirzapur Court House	h.s. " " "	60 1 49 32 23 19	4 787679 4 578904 4 849629	61331 37923 70734	11 616 7 182 13 397	h.s. " " "	65	25 21 58 13 53 7	4 852220 4 600543 5 021585	71157 39800 105090	13 477 7 549 19 904
53	Pándipura Bhawánipur Mirzapur Bungalow	h.s. " " "	88 39 59 34 19 31	4 801562 4 532874 4 725313	63323 35717 53127	11 993 6 765 10 062	h.s. " " "	66	54 8 43	4 511439 4 424284 4 600543	32467 26563 39860	6 149 5 031 7 549
54	Pana Bhawánipur Mirzapur Bungalow	h.s. " " "	93 14 52 35 32 33	4 801562 4 566665 4 694045	63323 36869 49436	11 993 6 983 9 363	h.s. " " "	67	113 57 45 27 10 5	4 587493 4 286174 4 424284	38681 19327 26563	7 326 3 661 5 031
55	Ganges River No. 45 Bhawánipur Mirzapur Cantonment	h.s. " " "	73 23 1 35 26 23	4 854975 4 656813 4 849629	71610 43332 70734	13 563 8 207 13 397	h.s. " " "	68	78 42 11 32 19 51	5 043035 4 779729 5 021585	110417 60218 105090	20 912 11 495 19 904

NOTE.—Stations Chapri, XXIX, and Pokra, XXXI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

* There are two more triangles to this station, See Nos. 165 and 166. † There are two more triangles to this station, See Nos. 163 and 232.

‡ There is one more triangle to this station, See No. 235.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
69	Murchia, I Kasda, II Sanderipahar Hill Mark	68 43 20 44 25 28	4° 04' 07.94 4° 8' 16.535 4° 9' 35.009	87256 65544 86101	16° 526 12° 414 16° 307	82	Tatpahar Bautrani Kapar	57 24 35 93 59 5	4° 49' 60.03 4° 25' 05.44 4° 56' 35.59	31333 17805 37099	5° 934 3° 372 7° 026	Inch 12 "
70	Chapri, XXIX Murchia, I Tatpahar Hill Mark	67 17 16 30 54 37	4° 09' 09.91 4° 73' 67.51 5° 02' 15.85	97947 54545 105096	18° 551 10° 330 19° 904	83	Murchia, I Kasda, II Bargawa	11 58 38 18 13 31	4° 55' 04.57 4° 72' 85.94 4° 93' 50.09	35519 53530 86101	6° 727 10° 138 16° 307	18 "
71	Murchia, I Kasda, II Deori Sohia Mark	58 21 35 46 48 27	4° 88' 05.19 4° 8' 13.169 4° 93' 50.09	75948 65038 86101	14° 384 12° 318 16° 307	84	Pokra, XXXI Murchia, I Bargawa	30 4 13 52 20 0	4° 72' 85.94 4° 92' 19.7 5° 02' 48.75	53530 84566 105895	10° 138 16° 016 20° 056	"
72	Pokra, XXXI Kasda, II Deori Sohia Mark	39 14 19 20 21 3	4° 88' 05.19 4° 62' 07.12 5° 01' 51.42	75948 4755 103548	14° 384 7° 908 19° 611	85	Murchia, I Bargawa Bardi	43 22 59 121 52 58	4° 63' 64.96 4° 20' 50.25 4° 72' 85.94	43301 16033 53530	8° 201 3° 037 10° 138	"
73	Chapri, XXIX Murchia, I Basai Gopat	14 7 37 148 27 25	4° 77' 08.7 4° 89' 81.49 4° 67' 74.55	60129 49032 105096	11° 388 9° 286 19° 904	86	Murchia, I Sanderipahar Hill Mark Sihawal	98 34 35 52 51 46	4° 91' 00.88 4° 59' 44.83 4° 81' 65.35	81300 39308 65544	15° 398 7° 445 12° 414	18 7
74	Kasda, II Murchia, I Amdara Peak	65 19 7 33 8 12	4° 89' 81.49 4° 67' 74.55 4° 93' 50.09	79095 47583 86101	14° 980 9° 012 16° 307	87	Murchia, I Gurdari Hill Mark Sihawal	70 49 0 76 40 5	4° 83' 92.74 4° 59' 44.83 4° 85' 22.20	69068 39308 71157	13° 081 7° 445 13° 477	18 7
75	Pokra, XXXI Murchia, I Amdara Peak	46 58 8 31 10 26	4° 89' 81.49 4° 74' 82.67 5° 02' 48.75	79095 56010 105895	14° 980 10° 608 20° 056	88	Tatpahar Khamerji Baragaon	62 19 26 56 12 57 61 27 37	4° 84' 08.19 4° 81' 32.61 4° 83' 73.22	69314 65052 68758	13° 128 12° 320 13° 022	12 "
76	Kasda, II Murchia, I Cheropahar Peak	55 34 16 37 7 11	4° 85' 18.52 4° 71' 01.53 4° 93' 50.09	71097 32018 86101	13° 465 9° 852 16° 307	89	Chapri, XXIX Tatpahar Baragaon	112 11 5 32 25 19	4° 81' 32.61 5° 01' 70.40 4° 77' 97.29	65052 104002 60218	12° 320 19° 697 11° 405	"
77	Pokra, XXXI Murchia, I Cheropahar Peak	37 17 42 27 11 27	4° 85' 18.52 4° 79' 31.12 5° 02' 48.75	71097 53618 105895	13° 465 10° 155 20° 056	90	Murchia, I Chapri, XXIX Baragaon	67 35 24 69 6 1	5° 01' 70.40 4° 88' 74.39 5° 02' 15.85	104002 77167 105096	19° 697 14° 615 19° 904	18 12
78	Chapri, XXIX Murchia, I Pakera	31 21 32 115 36 4	4° 83' 03.8 4° 78' 27.98 5° 02' 15.85	63539 60645 105096	12° 034 11° 486 19° 904	91	Tatpahar Khamerji Pahari	40 28 26 103 39 29	4° 61' 76.19 4° 66' 20.92 4° 83' 73.22	41459 45930 68758	7° 852 8° 699 13° 022	"
79	Murchia, I Gurdari Hill Mark Pakera	45 14 39 75 6 28	4° 71' 83.86 4° 83' 03.8 4° 85' 22.20	52286 63539 71157	9° 903 12° 034 13° 477	92	Tatpahar Baragaon Pahari	40 31 49 113 0 50	4° 49' 81.34 4° 66' 20.92 4° 81' 32.61	31487 45930 65052	5° 963 8° 699 12° 320	"
80	Murchia, I Katra, IV Khamerji	65 17 27 67 23 26	5° 15' 40.12 5° 10' 09.86 5° 06' 20.83	142565 144873 115367	27° 001 27° 438 21° 850	93	Khamerji Pahari Pátpara	115 59 9 45 53 51	4° 71' 51.49 4° 25' 41.31 4° 61' 76.19	51898 17953 41459	9° 829 3° 400 7° 852	"
81	Tatpahar Khamerji Bautrani	76 6 15 31 2 13	4° 84' 41.54 4° 59' 35.9 4° 83' 73.22	69848 57099 68758	13° 229 7° 026 13° 022	94	Tatpahar Khamerji Pátpara	75 30 43 89 21 13	4° 25' 41.31 4° 82' 33.15 4° 83' 73.22	17953 66576 68758	3° 400 12° 009 13° 022	"

NOTE.—Stations Chapri, XXIX and Pokra, XXXI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. * Base deduced by two sides and included angle.

SECONDARY TRIANGULATION. TRIANGLES.

15—N.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	Inch
			Log. feet	Feet	Miles				Log. feet	Feet	Miles		
95	Tatapahar Baragaon Karbara	h.s. " s. 136 25 35	4.507202 4.578263 4.813261	32152 37867 65052	6.089 7.172 12.320	108	Khámerji Kesra Hill Mark Mau Rock	85 21 53 37 48 3	4.789353 4.713549 4.578178	61568 51707 37860	11.661 9.793 7.170	"	12
96	Baragaon Pahári Karbara	h.s. " s. 85 35 18 77 32 13	3.971308 4.507202 4.498134	9361 32152 31487	1.773 6.089 5.963	109	Khámerji Machir Mau Rock	117 13 54 41 58 18	4.314860 4.713549 4.589840	20647 51707 38890	3.910 9.793 7.306	"	"
97	Pahári Karbara Murda Hill Temple	h.s. " s. 30 8 6 123 41 8	4.027426 4.246861 3.971308	10652 17655 9361	2.017 3.344 1.773	110	Jamaura, III Katra, IV Chaunia Hill Mark	39 30 33 62 52 19	4.802927 4.948717 4.989112	63522 88862 97524	12.031 16.830 18.470	18	"
98	Khámerji Baragaon Nagrai Rock	h.s. " s. 27 59 1 106 37 53	4.711762 4.530753 4.840819	51495 33943 69314	9.753 6.429 13.128	111	Murchia, I Jamaura, III Chaunia Hill Mark	43 16 25 23 48 29	4.948717 4.718751 5.077008	88862 52330 119401	16.830 9.911 22.614	"	"
99	Khámerji Bilauhi Kesra Hill Mark	h.s. " s. 139 40 9 9 27 10	5.173752 4.578178 5.073011	149194 37860 118307	28.256 7.170 22.407	112	Murchia, I Katra, IV Murli	13 31 29 27 20 10	4.615321 4.908367 5.062083	41240 80978 115367	7.811 15.337 21.850	"	"
100	Khámerji Nagrai Rock Kesra Hill Mark	h.s. s. 127 47 12 27 38 16	4.809563 4.578178 4.530753	64500 37860 33943	12.216 7.170 6.429	113	Katra, IV Chaunia Hill Mark Murli	22 34 39 125 31 40	4.476646 4.615321 4.802927	29967 41240 63522	5.676 7.811 12.631	"	12
101	Baragaon Khámerji Taripater Rock	h.s. " s. 17 27 56 115 9 21	4.750882 4.361408 4.840819	56348 22983 69314	10.672 4.353 13.128	114	Jamaura, III Katra, IV Kálapatri Hill Mark	28 41 59 60 29 0	4.670596 4.928782 4.989112	46838 84875 97524	8.871 16.075 18.470	18	"
102	Tatapahar Baragaon Taripater Rock	h.s. " s. 108 50 20 54 27 17	4.361408 4.878908 4.813261	22983 75667 65052	4.353 14.331 12.320	115	Katra, IV Murli Kálapatri Hill Mark	20 11 20 99 33 4	4.214624 4.670596 4.615321	16392 46838 41240	3.104 8.871 7.811	18	12
103	Murchia, I Jamaura, III Adhesar Hill Mark	h.s. " s. 50 18 34 8 24 11	5.031471 4.310016 5.077008	107515 20418 119401	20.363 3.867 22.614	116	Khámerji Baragaon Sabkalai	38 41 47	4.928851 5.044686 4.840819	84889 110837 69314	16.077 20.992 13.128	"	"
104	Murchia, I Kasda, II Adhesar Hill Mark	126 3 27 9 32 58	4.997814 4.310016 4.935009	99498 20418 86101	18.844 3.867 16.307	117	Khámerji Baragaon Bilauhi	114 11 34 32 18 17	4.854852 5.073011 4.840819	71590 118307 69314	13.559 22.407 13.128	"	"
105	Murchia, I Adhesar Hill Mark Parsia	59 41 59 77 4 28	4.257371 4.159774 4.310016	18087 14347 20418	3.426 2.717 3.867	118	Baragaon Sabkalai Bilauhi	55 46 7 101 22 29	4.526776 4.854852 4.928851	33634 71590 84889	6.370 13.559 16.077	"	"
106	Khámerji Nagrai Rock Machir	h.s. s. 98 45 51 59 36 38	4.161419 4.589840 4.530753	14502 38890 33943	2.747 7.366 6.429	119	Murchia, I Katra, IV Bilauhi	45 20 17 123 34 34	4.425291 4.993391 5.062083	26625 98490 115367	5.043 18.053 21.850	18	12
107	Nagrai Rock Machir Mau Temple	s. h.s. 10 17 41 163 32 10	4.382307 4.582571 4.161419	24116 38245 14502	4.567 7.243 2.747	120	Baragaon Bilauhi Baraiha (?) Tree Flag	24 54 42 67 52 33	4.479876 4.822151 4.854832	30191 66397 71590	5.718 12.575 13.559	"	"

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
121	Katra, IV Bilauhi Baraiha (?) Tree Flag	h.s. 33 24 52 117 31 50	4.479876 4.686777 4.425291	30191 48616 26625	5.718 9.208 5.043	134	Tikor, V Meja, VI Sansarpur Hill Mark	57 32 57 79 24 28	4.951987 5.018256 4.859853	89534 104293 72419	16.957 19.753 13.716	Inch 18 "
122	Bilauhi Baraiha (?) Tree Flag Jigni	h.s. 67 59 19 42 11 13	4.619928 4.625296 4.479876	41680 42198 30191	7.894 7.992 5.718	135	Katra, IV Murli Mugarikot	96 50 9 17 10 13 65 59 38	4.631513 4.124746 4.615321	44824 13327 41240	8.489 2.524 7.811	18 12 "
123	Katra, IV Bilauhi Naun Hill Mark	h.s. 25 27 12 83 24 25	4.082500 4.446376 4.425291	12092 27950 26625	2.290 5.293 5.043	136	Katra, IV Meja, VI Chalinga Hill Mark	134 50 0 6 23 40	5.054555 4.250589 5.000542	113385 17807 100125	21.474 3.373 18.903	18 "
124	Bilauhi Jigni Birohi Rock	h.s. 7 57 47 6 45 41	4.361729 4.291075 4.625296	23000 19547 42198	4.356 3.702 7.992	137	Katra, IV Mugarikot Chalinga Hill Mark	102 54 46 45 4 57	4.389355 4.250589 4.124746	24511 17807 13327	4.642 3.373 2.524	18 12
125	Bilauhi Naun Hill Mark Birohi Rock	h.s. 83 6 39 33 33 34	4.336783 4.291075 4.082500	21716 19547 12092	4.113 3.702 2.290	138	Katra, IV Meja, VI Majgaon Hill Mark	64 39 52 36 41 15	4.965203 4.785424 5.000542	92300 61013 100125	17.481 11.556 18.903	18 "
126	Jigni Birohi Rock Kodalil Hill Mark	h.s. 49 10 31 62 57 0	4.273879 4.344635 4.361729	18788 22112 23000	3.558 4.188 4.356	139	Tikor, V Meja, VI Majgaon Hill Mark	44 39 33 101 52 18	4.965203 5.108927 4.859853	92300 128507 72419	17.481 24.338 13.716	" "
127	Bilauhi Jigni Kodalil Hill Mark	h.s. 29 57 40 42 24 50	4.344635 4.475146 4.625296	22112 29864 42198	4.188 5.656 7.992	140	Katra, IV Mugarikot Daia	63 10 42 94 33 36 22 15 42	4.496861 4.544917 4.124746	31395 35068 13327	5.946 6.642 2.524	" 12 "
128	Bilauhi Birohi Rock Naun Temple	h.s. 13 19 30 21 8 52	3.900870 4.091484 4.291075	7959 12459 19547	1.507 2.360 3.702	141	Katra, IV Majgaon Hill Mark Daia	33 24 24 115 16 46	4.569961 4.544917 4.785424	37150 35068 61013	7.036 6.642 11.556	18 12
129	Bilauhi Baraiha (?) Tree Flag Hanumana Rock	h.s. 23 51 36 135 28 2	4.240884 4.181774 4.479876	17413 15198 30191	3.298 2.878 5.718	142	Katra, IV Mugarikot Katra Pass	68 38 34 29 50 53 81 30 33	4.098635 3.826502 4.124746	12550 6707 13327	2.377 1.270 2.524	18 12 7
130	Katra, IV Bilauhi Hanumana Rock	h.s. 93 40 14 57 32 19	4.181774 4.498184 4.425291	15198 31491 26625	2.878 5.964 5.043	143	Mugarikot Daia Katra Pass	64 42 43 23 33 1 139 49 14	4.453311 4.098635 4.098635	28400 12550 31395	5.379 2.377 5.946	12 "
131	Bilauhi Hanumana Rock Baisaur Rock	h.s. 67 28 24 48 31 34	4.260805 4.272674 4.181774	18231 18736 15198	3.453 3.548 2.878	144	Mugarikot Katra Pass Katra Patrol's Bungalow	28 17 43 23 33 1 139 49 14	3.964745 3.602680 4.098635	9220 4006 12550	1.746 0.759 2.377	7 "
132	Bilauhi Sabbalai Baisaur Rock	h.s. 91 48 18	4.436928 4.272674 4.326776	27348 18736 33634	5.180 3.548 6.370	145	Mugarikot Katra Pass Katra Dāk Bungalow	125 22 36 46 19 30	4.150687 3.398685 4.098635	14148 2504 12550	2.679 0.474 2.377	12 7
133	Katra, IV Murli Garbara Temple	h.s. 16 32 39 20 35 37	4.288946 4.380694 4.615321	19451 24027 41240	3.684 4.551 7.811	146	Katra, IV Chaunia Hill Mark Baraunda Bridge	101 48 9 45 13 0	4.942526 4.687691 4.802927	87604 48718 63522	16.592 9.227 12.031	18 7

SECONDARY TRIANGULATION. TRIANGLES.

17—X.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle used	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
147	Katra, IV Munli Baraunda	78 8 14 43 9 37	4.770863 4.711941 4.615321	59001 51516 41240	11.175 9.757 7.811	Inch 18 7	Meja, VI Kohrář Kohrář Temple	6 38 32 40 8 44	3.911465 4.657626 4.710869	8156 45400 51389	1.545 8.010 9.733	Inch 18 12
148	Katra, IV Meja, VI Bakshipahár Hill Mark	62 58 50 73 20 43	5.111148 5.142730 5.000342	129166 138009 100125	24.463 26.309 18.963	18 12	Kohrář Daraul Kohrář Temple	5 58 53	4.412592 3.911465 4.523939	25858 8156 33415	4.897 1.545 6.329	"
149	Katra, IV Bakshipahár Hill Mark Karaun Fort	41 12 56 115 5 28	5.004593 4.789832 5.142730	101063 61636 138909	19.141 11.673 26.309	18 12	Meja, VI Kohrář Rámnagar Temple	82 46 45	4.816641 4.678326 4.710869	65560 47679 51389	12.417 9.030 9.733	18
150	Katra, IV Majgaon Hill Mark Karaun Fort	42 53 58 67 48 37	4.651806 4.789832 4.785424	44855 61636 61013	8.495 11.673 11.556	18 12	Tikor, V Baripur, VII Ganges River No. 45	61 59 26 46 1 36	4.850856 4.768088 4.889123	71921 58626 77468	13.621 11.103 14.672	"
151	Tikor, V Meja, VI Kusalpurwa Mark	27 3 4 17 43 36	4.669866 4.495613 4.859853	46759 31305 72419	8.856 5.929 13.716	18	Tikor, V Ganges River No. 45 Siwára	73 56 21 37 41 25	4.782507 4.586118 4.768088	60605 38558 58626	11.478 7.303 11.103	"
152	Katra, IV Meja, VI Kohrář	106 46 28 50 3 15	4.710869 5.097059 5.000542	51389 125043 100125	9.733 23.682 18.963	" 12	Tikor, V Siwára Pándipura	55 55 48 44 2 0	4.662302 4.737486 4.586118	45952 54637 38558	8.703 10.348 7.303	"
153	Katra, IV Bakshipahár Hill Mark Kohrář	78 21 2 13 50 29	4.958107 5.097059 5.142730	90805 125043 138909	17.198 23.682 26.309	"	Tikor, V Ganges River No. 45 Pándipura	18 0 33 68 27 56 93 31 31	4.259107 4.737486 4.768088	18160 54637 58626	3.439 10.348 11.103	"
154	Meja, VI Kohrář Chandas	157 43 17 56 14 44	4.510928 4.298609 4.710869	32429 19889 51389	6.142 3.767 9.733	18 7	Tikor, V Ganges River No. 45 Bhawánpur	55 55 52 80 42 37	4.849629 4.925672 4.768088	70734 84270 58626	13.397 15.960 11.103	"
155	Meja, VI Majgaon Hill Mark Chandas	112 15 2 53 10 7	4.918633 4.298609 4.965203	82915 19889 92300	15.704 3.767 17.481	18 7	Tikor, V Pándipura Bhawánpur	37 55 19 102 52 34	4.725313 4.925672 4.737486	53127 84270 54637	10.062 15.960 10.348	"
156	Meja, VI Chandas Meja	151 1 39 15 48 14	4.231847 3.763658 4.298609	17055 5803 19889	3.230 1.099 3.767	18 7	Siwára Pándipura Lálganj	63 10 16 11 32 53 105 16 51	4.628473 3.979376 4.662302	42508 9536 45952	8.051 1.806 8.703	7
157	Meja, VI Meja Meja Tahsildári	18 21 16 133 52 10	3.593421 3.953143 3.763658	3921 8977 5803	0.743 1.700 1.099	18 7	Lálganj Siwára Tulsipur Pagoda	107 14 8 33 17 0	4.156085 3.915437 3.979376	14325 8231 9336	2.713 1.559 1.806	"
158	Meja, VI Meja Meja Fort	32 48 1 108 30 38	3.701481 3.944642 3.763658	5029 8803 5803	0.952 1.667 1.099	18 7	Tikor, V Siwára Matura	49 5 19 110 38 26	4.493293 4.154581 4.586118	31138 14275 38558	5.897 2.704 7.303	18
159	Meja, VI Kohrář Daraul	30 32 18 128 36 29	4.523939 4.369405 4.710869	33415 23410 51389	6.329 4.434 9.733	12 "	Tikor, V Matura Bhikápurwa	53 35 24 27 3 31 99 21 5	4.066074 3.818309 4.154581	11643 6581 14275	2.205 1.246 2.704	18 7 "

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	Inch
			Log. feet	Feet	Miles				Log. feet	Feet	Miles		
173	Matura Bhikapurwa Lalganj Pagoda	s. h.s. 91 18 48 41 34 22	4'201029 4'023031 4'066074	15887 10545 11643	3'009 1'997 2'205	186	Ganges River No. 45 Pándipura Mirzapur Church	h.s. " 75 57 1 79 0 24	4'619270 4'624416 4'259107	41617 42113 18160	7'882 7'976 3'439	Theodolite used	18
174	Tikor, V Ganges River No. 45 Mara East	h.s. " 92 20 33 15 32 40 72 6 47	4'780241 4'217716 4'768088	61552 16509 58626	11'638 3'127 11'103	187	Jhúsi Moia Ganges River No. 7	s. " 52 44 44 45 47 24 81 27 52	4'043700 3'998203 4'137975	11059 9959 13740	2'094 1'886 2'602	"	12
175	Tikor, V Kusapurwa Mark Mara East	h.s. " 62 20 50 85 54 58	4'444041 4'217716 4'495013	27800 16509 31305	5'265 3'127 5'929	188	Moia Ganges River No. 7 Ditto No. 8	s. " 47 7 5 51 23 44 81 29 11	3'913472 3'941426 4'043700	8194 8738 11059	1'552 1'655 2'094	"	"
176	Tikor, V Mara East Mara Dome	h.s. " 20 11 17 123 23 45	3'982137 4'365817 4'217716	9597 23218 16509	1'818 4'397 3'127	189	Jhúsi Moia Ganges River No. 8	s. " 31 36 17 92 54 29 55 29 14	3'941426 4'221488 4'137975	8738 16633 13740	1'655 3'154 2'602	"	"
177	Katra, IV Tikor, V Mara Dome	h.s. " 13 47 11 86 36 53	4'365817 4'987930 4'981492	23218 97259 95828	4'397 18'420 18'149	190	Moia Ganges River No. 8 Ditto No. 9	s. " 55 33 30 66 27 28 57 59 2	3'929379 3'975340 3'941426	8499 9448 8738	1'610 1'789 1'655	"	"
178	Tikor, V Mara East Tikor Hill Mark	h.s. " 81 24 23 43 50 52	4'300804 4'140281 4'217716	19990 14005 16509	3'786 2'652 3'127	191	Ganges River No. 8 Ditto No. 9 Ditto No. 10	s. " 92 14 52 54 35 45 33 9 23	4'191116 4'102652 3'929379	15528 12666 8499	2'941 2'399 1'610	"	"
179	Tikor, V Bhikapurwa Tikor Hill Mark	h.s. " 80 22 26 72 55 55	4'159684 4'146281 3'818309	14444 14005 6581	2'736 2'652 1'246	192	Ganges River No. 8 Ditto No. 10 Ditto No. 11	s. " 40 36 6 114 9 53 25 14 1	4'286371 4'433098 4'102652	19336 27108 12666	3'662 5'134 2'399	"	"
180	Tikor, V Mara East Mara Temple	h.s. " 21 18 35 127 32 55	4'064491 4'423279 4'217716	11601 25309 16509	2'197 4'793 3'127	193	Ganges River No. 9 Ditto No. 10 Ditto No. 11	s. " 56 46 58 81 0 30 42 12 32	4'286371 4'358483 4'191116	19336 22829 15528	3'662 4'324 2'941	"	"
181	Katra, IV Tikor, V Mara Temple	h.s. " 15 2 58 85 29 35	4'403279 4'987541 4'981492	25309 97172 95828	4'793 18'404 18'149	194	Ganges River No. 10 Ditto No. 11 Ditto No. 12	s. " 56 11 50 63 53 25 59 54 45	4'268802 4'302477 4'286371	18570 20067 19336	3'517 3'801 3'662	"	"
182	Mara East Mara Temple Mara West	h.s. " 18 10 19 138 47 53	3'739767 3'838207 4'064491	5492 6890 11601	1'040 1'305 2'197	195	Ganges River No. 10 Ditto No. 11 Ditto No. 13	s. " 35 43 14 84 14 26 60 2 20	4'114959 4'346473 4'286371	19336 22206 19336	2'468 4'206 3'662	"	"
183	Mara East Mara West Bharatgarj Pagoda	h.s. " 25 12 3 105 53 42	3'590257 3'944128 3'838207	3893 8793 6890	0'737 1'665 1'305	196	Ganges River No. 11 Ditto No. 12 Ditto No. 13	s. " 20 21 1 35 30 6 124 8 53	3'892265 4'114959 4'268802	7803 13030 18570	1'478 2'468 3'517	"	"
184	Mara East Mara West Birpur Hill Pagoda	h.s. " 60 52 1 85 28 50	4'035834 4'093223 3'838207	10860 12394 6890	2'057 2'347 1'305	197	Ganges River No. 12 Ditto No. 13 Ditto No. 14	s. " 72 22 42 81 53 48 25 43 30	4'233851 4'250365 3'892265	17134 17798 7803	3'245 3'371 1'478	"	"
185	Ganges River No. 45 Pándipura Kataia Hill Pagoda	h.s. " 96 54 44 47 46 36 35 18 40	4'493999 4'366710 4'259107	31189 23265 18160	5'907 4'406 3'439	198	Ganges River No. 13 Ditto No. 14 Ditto No. 15	s. " 29 34 59 123 54 8 26 30 53	4'277549 4'503173 4'233851	18947 31855 17134	3'589 6'033 3'245	"	"

SECONDARY TRIANGULATION. TRIANGLES.

19 N.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Theodolite used	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles	
199	Ganges River No. 12 Ditto No. 14 Ditto No. 15	42 27 52 98 10 38 39 21 30	4' 277549 4' 443722 4' 250365	18947 27779 17798	3' 389 5' 261 3' 371	212	Inch 12	Ganges River No. 24 Ditto No. 25 Ditto No. 27	32 25 26 113 32 5 34 2 29	4' 008749 4' 241723 4' 027466	10204 17447 10653	1' 932 3' 304 2' 018	Inch 12
200	Ganges River No. 14 Ditto No. 15 Ditto No. 16	40 44 28 61 39 41 77 35 51	4' 102480 4' 232365 4' 277549	12661 17075 18947	2' 398 3' 234 3' 589	213	" "	Ganges River No. 24 Ditto No. 27 Ditto No. 28	47 24 29 94 37 35 37 57 56	4' 319707 4' 451298 4' 241723	20879 28268 17447	3' 954 5' 354 3' 304	" "
201	Ganges River No. 14 Ditto No. 16 Ditto No. 17	37 7 14 90 45 48 52 6 58	4' 115820 4' 335108 4' 232265	13056 21633 17075	2' 473 4' 097 3' 234	214	" "	Ganges River No. 24 Ditto No. 28 Ditto No. 29	28 16 4 62 38 36 89 5 20	4' 126758 4' 399846 4' 451298	13389 25110 28268	2' 536 4' 756 5' 354	" "
202	Ganges River No. 16 Ditto No. 17 Ditto No. 18	67 0 40 53 20 0 59 39 20	4' 143860 4' 084048 4' 115820	13927 12135 13056	2' 638 2' 298 2' 473	215	" "	Ganges River No. 24 Ditto No. 29 Ditto No. 30	35 39 45 13 15 57 131 4 18	4' 288215 3' 883264 4' 399846	19418 7643 25110	3' 678 1' 448 4' 756	" "
203	Ganges River No. 16 Ditto No. 18 Ditto No. 19	41 18 13 84 57 54 53 43 53	3' 997153 4' 175898 4' 084048	9935 14993 12135	1' 882 2' 840 2' 298	216	" "	Ganges River No. 24 Ditto No. 26 Ditto No. 30	47 10 48 51 51 32 80 57 40	3' 852966 3' 883264 3' 982142	7128 7643 9397	1' 350 1' 448 1' 818	" "
204	Ganges River No. 18 Ditto No. 19 Ditto No. 20	44 47 47 83 52 31 51 19 42	3' 952583 4' 102161 3' 997153	8966 12652 9935	1' 698 2' 396 1' 882	217	" "	Ganges River No. 26 Ditto No. 30 Ditto No. 31	111 57 50 45 42 0 22 20 10	4' 240416 4' 127866 3' 852966	17395 13424 7128	3' 294 2' 542 1' 350	" "
205	Ganges River No. 19 Ditto No. 20 Ditto No. 21	36 23 54 102 25 56 41 10 10	3' 907511 4' 123862 3' 952583	8082 13300 8966	1' 531 2' 519 1' 698	218	" "	Ganges River No. 26 Ditto No. 30 Ditto No. 32	68 4 23 60 37 34 51 18 3	3' 928015 3' 900862 3' 852966	8473 7959 7128	1' 605 1' 507 1' 350	" "
206	Ganges River No. 20 Ditto No. 21 Ditto No. 22	90 15 37 56 57 5 32 47 18	4' 173879 4' 097235 3' 907511	14924 12509 8082	2' 826 2' 369 1' 531	219	" "	Ganges River No. 26 Ditto No. 31 Ditto No. 32	43 53 27 35 40 9 100 26 24	3' 976029 3' 900862 4' 127866	9463 7959 13424	1' 792 1' 507 2' 542	" "
207	Ganges River No. 21 Ditto No. 22 Ditto No. 23	34 1 59 89 3 32 56 54 29	3' 998674 4' 250682 4' 173879	9970 17811 14924	1' 888 3' 372 2' 826	220	" "	Ganges River No. 31 Ditto No. 32 Ditto No. 33	75 36 41 53 23 52 50 59 27	4' 071741 3' 990187 3' 976029	11796 9777 9463	2' 234 1' 852 1' 792	" "
208	Ganges River No. 22 Ditto No. 23 Ditto No. 24	56 47 34 74 47 56 48 24 30	4' 047400 4' 109366 3' 998674	11153 12864 9970	2' 112 2' 436 1' 888	221	" "	Ganges River No. 31 Ditto No. 33 Ditto No. 34	46 42 44 62 55 31 70 21 45	3' 878294 3' 965862 3' 990187	7556 9243 9777	1' 431 1' 751 1' 852	" "
209	Ganges River No. 22 Ditto No. 24 Ditto No. 25	50 58 14 59 18 15 69 43 31	4' 027466 4' 071587 4' 109366	10653 11793 12864	2' 018 2' 233 2' 436	222	" "	Ganges River No. 33 Ditto No. 34 Ditto No. 35	67 58 50 68 13 36 43 47 34	4' 005261 4' 006011 3' 878294	10122 10139 7556	1' 917 1' 920 1' 431	" "
210	Ganges River No. 23 Ditto No. 24 Ditto No. 25	35 11 1 107 42 45 37 6 14	4' 027466 4' 245862 4' 047400	10653 17012 11153	2' 018 3' 336 2' 112	223	" "	Ganges River No. 33 Ditto No. 35 Ditto No. 36	54 22 48 95 41 3 29 56 9	4' 217920 4' 305744 4' 006011	16517 20218 10139	3' 128 3' 829 1' 920	" "
211	Ganges River No. 23 Ditto No. 24 Ditto No. 26	52 7 17 61 20 43 66 32 0	3' 982142 4' 028153 4' 047400	9597 10670 11153	1' 818 2' 021 2' 112	224	" "	Ganges River No. 35 Ditto No. 36 Ditto No. 37	40 2 8 64 11 16 75 46 36	4' 039890 4' 185793 4' 217920	10960 15339 16517	2' 076 2' 905 3' 128	" "

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles	
225	Ganges River No. 35	s.	4.102358	12658	2.397	Inch 12	238	Ganges River No. 44	s.	4.314860	32724	6.198	Inch 12
	Ditto No. 37	"	4.021200	10500	1.989	"		Ditto No. 45	h.s.	4.389761	38883	7.364	"
	Ditto No. 38	"	4.185793	15339	2.995	"		Ditto No. 49	s.	4.092075	12362	2.341	"
226	Ganges River No. 37	s.	3.959477	8964	1.698	"	239	Ganges River No. 47	s.	4.129154	13463	2.550	"
	Ditto No. 38	"	4.063424	11572	2.192	"		Ditto No. 48	"	4.298046	19863	3.702	"
	Ditto No. 39	"	4.102358	12658	2.397	"		Ditto No. 49	"	4.114409	13014	2.465	"
227	Ganges River No. 38	s.	3.868477	7387	1.399	"	240	Ganges River No. 48	s.	4.016188	10380	1.966	"
	Ditto No. 39	"	3.907135	8075	1.529	"		Ditto No. 49	"	4.274337	18868	3.562	"
	Ditto No. 40	"	3.952477	8964	1.698	"		Mirzapur Church	"	4.129154	13463	2.550	"
228	Ganges River No. 39	s.	4.075777	11906	2.255	"	241	Jhusi	s.	3.979703	9543	1.807	"
	Ditto No. 40	"	4.137574	13727	2.600	"		Ganges River No. 8	"	4.370396	23464	4.444	"
	Ditto No. 41	"	3.868477	7387	1.399	"		Lowana Tree	"	4.221488	10653	3.154	"
229	Ganges River No. 39	s.	4.162493	14538	2.753	"	242	Ganges River No. 10	s.	4.048328	11177	2.117	"
	Ditto No. 41	"	4.058264	11436	2.166	"		Ditto No. 11	"	4.353184	22552	4.271	"
	Ditto No. 42	"	4.137574	13727	2.600	"		Dia Shiwalla	"	4.286371	19336	3.662	"
230	Ganges River No. 41	s.	4.138838	13454	2.548	"	243	Ganges River No. 11	s.	4.002668	10062	1.906	"
	Ditto No. 42	"	4.135444	14208	2.691	"		Ditto No. 12	"	4.048328	11177	2.117	"
	Ditto No. 43	"	4.162493	14538	2.753	"		Dia Shiwalla	"	4.268802	18570	3.517	"
231	Ganges River No. 42	s.	4.146907	14025	2.656	"	244	Ganges River No. 11	s.	4.141366	13847	2.623	"
	Ditto No. 43	"	4.205056	16035	3.037	"		Ditto No. 12	"	4.285953	19318	3.659	"
	Ditto No. 44	"	4.128838	13454	2.548	"		Kukra Shiwalla	"	4.268802	18570	3.517	"
232	Ganges River No. 42	s.	4.417226	26135	4.950	"	245	Ganges River No. 11	s.	4.249657	17769	3.365	"
	Ditto No. 43	"	4.430876	26970	5.108	"		Ditto No. 13	"	4.285953	19318	3.659	"
	Ditto No. 45	h.s.	4.128838	13454	2.548	"		Kukra Shiwalla	"	4.114959	13030	2.468	"
233	Ganges River No. 43	s.	4.386087	24327	4.607	"	246	Ganges River No. 14	s.	4.227475	16884	3.198	"
	Ditto No. 45	h.s.	4.315997	20701	3.921	"		Ditto No. 15	"	3.049152	4458	0.844	"
	Ditto No. 46	s.	4.417226	26135	4.950	"		Garaia Shiwalla	"	4.277549	18947	3.589	"
234	Ganges River No. 43	s.	4.308760	20359	3.856	"	247	Ganges River No. 14	s.	3.967294	9275	1.757	"
	Ditto No. 44	"	4.315997	20701	3.921	"		Ditto No. 15	"	4.077767	11961	2.265	"
	Ditto No. 46	"	4.146907	14025	2.656	"		Damdama Shiwalla	"	4.277549	18947	3.589	"
235	Ganges River No. 44	s.	4.237470	17277	3.272	"	248	Ganges River No. 15	s.	3.825489	6691	1.267	"
	Ditto No. 46	"	4.293093	19638	3.719	"		Ditto No. 16	"	3.967294	9275	1.757	"
	Ditto No. 47	"	4.308760	20359	3.856	"		Damdama Shiwalla	"	4.102480	12661	2.398	"
236	Ganges River No. 46	s.	4.114409	13014	2.465	"	249	Ganges River No. 30	s.	4.046379	11127	2.107	"
	Ditto No. 47	"	4.132441	13566	2.599	"		Ditto No. 31	"	3.883783	7632	1.449	"
	Ditto No. 48	"	4.237470	17277	3.272	"		Bankata Shiwalla	"	4.240416	17395	3.294	"
237	Ganges River No. 45	h.s.	4.132441	13566	2.599	"	250	Ganges River No. 30	s.	3.708782	5114	0.969	"
	Ditto No. 46	s.	4.409612	25681	4.864	"		Ditto No. 31	"	4.096448	12487	2.365	"
	Ditto No. 48	"	4.386087	24327	4.607	"		Misrapur Shiwalla	"	4.240416	17395	3.294	"

* Base deduced by two sides and included angle.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
251	Ganges River No. 40 Ditto No. 41 Rampur Shiwála	s. " "	19 6 48 59 9 58	3'600056 4'018747 4'075777	3982 10441 11906	12 " "	Marár, XI Bispatia Machlishahr	39 49 14 88 13 16 51 57 30	4'567049 4'760398 4'656893	36902 57597 45383	6'989 10'908 8'595	Inch 24 12 "
252	Ganges River No. 44 Ditto No. 47 Shiopur House	s. " "	10 10 48 25 27 27	3'775020 4'100990 4'293093	5957 14487 19638	" "	Bispatia Machlishahr Ketulpur	54 16 42 60 43 42 64 59 36	4'519279 4'550468 4'567049	33058 35520 36902	6'261 6'727 6'989	" " "
253	Ganges River No. 45 Ditto No. 46 Khámária Shiwála	h.s. s.	16 2 15 127 26 17	4'052777 4'511276 4'386087	11292 32455 24327	" "	Machlishahr Ketulpur Saráia	57 41 25 58 28 34 63 50 1	4'493181 4'496891 4'519279	31130 31397 33058	5'896 5'946 6'261	" " "
254	Ganges River No. 44 Ditto No. 45 Moia N. Shiwála	s. h.s.	58 32 34 95 13 36	4'377632 4'444858 4'092075	23858 27852 12362	" "	Ketulpur Saráia Kámpur	50 16 17 60 8 13 69 35 30	4'407306 4'459463 4'493181	25545 28805 31130	4'838 5'455 5'896	" " "
255	Ganges River No. 45 Ditto No. 49 Moia N. Shiwála	h.s. s.	15 38 34 33 25 1	4'067478 4'377632 4'514869	11681 23858 32724	" "	Saráia Kámpur Barauli	56 32 42 71 24 47 52 2 31	4'431858 4'487261 4'407306	27031 30709 25545	5'119 5'816 4'838	" " "
256	Ganges River No. 44 Ditto No. 47 Moia S. Shiwála	s. "	13 34 53 135 19 15	3'950770 4'427062 4'293093	8928 26734 19638	" "	Kámpur Barauli Jagdshpur	61 27 38 55 35 19 62 57 3	4'425903 4'398622 4'431858	26663 25039 27031	5'050 4'742 5'119	" " "
257	Ganges River No. 46 Ditto No. 48 Bindháchal Shiwála	s. "	44 44 49 83 30 8	4'084950 4'234593 4'132441	12160 17163 13566	" "	Barauli Jagdshpur Jaunpur Fort	56 10 58 72 13 0 51 36 2	4'451259 4'510490 4'425903	28266 32396 26663	5'353 6'136 5'050	" " "
258	Ganges River No. 47 Ditto No. 49 Mirzapur Large Shiwála	s. "	8 18 34 27 1 17	3'695821 4'193260 4'298046	4964 15605 19863	" "	Barauli Jaunpur Fort Jaunpur Masjid Dome	6 40 39 98 52 46 51 36 2	3'592207 4'521463 4'510490	3910 33225 32396	0'741 6'293 6'136	" " "
259	Ganges River No. 48 Ditto No. 49 Mirzapur Great Shiwála	s. "	8 28 51 120 44 20	3'408734 4'174234 4'129154	2563 14937 13463	" "	Barauli Jagdshpur Jaunpur Masjid Spire	49 28 37 78 43 17 6 42 21	4'411446 4'522080 4'425903	25790 33272 26663	4'884 6'302 5'050	" " "
260	Seona, IX Marár, XI Sathar	s.	60 55 51 14 0 43	4'879449 4'321959 4'922748	75762 20987 83704	18 "	Barauli Jaunpur Fort Jaunpur Masjid Spire	6 42 21 99 28 39 139 14 30	3'595387 4'522080 4'510490	3939 33272 32396	0'746 6'302 6'136	" " "
261	Seona, IX Sathar Sarai Masjid	s.	12 44 12 64 16 47	3'676557 4'287894 4'321959	4749 19404 20987	" 12	Jaunpur Fort Jaunpur Masjid Spire A	15 55 25 138 38 37 16 4 35	3'971900 3'780325 3'595387	9373 6030 3939	1'775 1'142 0'746	" " "
262	Marár, XI Newáda, XIII Bispatia	s.	45 27 38 54 30 48 80 1 34	4'599082 4'656893 4'739521	39727 45383 54893	24 " 12	Jaunpur Fort Jaunpur Masjid Dome A X	19 43 14 144 32 2	3'450287 3'544919 3'780325	2820 3597 6030	0'534 0'664 1'142	" " "

* Base deduced by two sides and included angle.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
276	Jaunpur Fort A Jaunpur Jail	37 26 25 27 41 10	3 606461 3 489709 3 780325	4041 3088 6030	0 765 0 585 1 142	286	Orejhar, XXIV Fyzabad Great Dome Sugringari Tomb	77 46 29 88 19 13	4 275714 3 666452 4 285489	18867 4639 19297	3 573 0 879 3 655	Inch 24 7
277	Jaunpur Fort X Jaunpur Church	23 35 14 134 56 22	3 583574 3 831301 3 544919	3833 6781 3597	0 726 1 284 0 664	287	Orejhar, XXIV Sugringari Tomb Fyzabad Dome	63 22 29 97 36 19	4 104687 4 149533 3 666452	12726 14110 4639	2 410 2 672 0 879	24 7
278	Jaunpur Fort Jaunpur Masjid Dome Haud	19 59 27 20 16 49	3 586223 3 862867 3 592207	3857 7292 3910	0 730 1 381 0 741	288	Orejhar, XXIV Darsanganj Fyzabad Dome	97 47 52 50 30 38	4 258027 4 149533 3 982508	18115 14110 9605	3 431 2 672 1 819	24 7
279	Jaunpur Fort Haud Baradari Dome	56 21 29 52 34 50	3 807430 3 786972 3 862867	6418 6123 7292	1 216 1 160 1 381	289	Orejhar, XXIV Oudh Temple No. 1 a	35 20 13 61 13 10	3 550841 3 785775 3 731362	3555 6106 5387	0 673 1 156 1 020	"
280	Jaunpur Fort Haud Dariba Temple	15 24 25 50 20 34	3 309629 3 805597 3 862867	2040 6391 7292	0 386 1 210 1 381	290	Orejhar, XXIV Oudh Temple No. 1 Belua Bazar	43 8 45 11 16 15	4 275298 4 350567 3 731362	18849 22416 5387	3 570 4 246 1 020	"
281	Jaunpur Fort Haud Isapur Temple	57 46 55 50 28 10	3 812668 3 772500 3 862867	6496 5922 7292	1 230 1 122 1 381	291	Orejhar, XXIV Belua Bazar Sarju River	78 31 28 42 24 40	4 408439 4 246156 4 350567	25612 17626 22416	4 851 3 338 4 246	"
OUDH SECONDARY SERIES.												
282	Rahet, XXII Orejhar, XXIV Mao Temple	28 44 47 41 15 12	4 509785 4 646842 4 800685	32343 44345 63195	6 126 8 399 11 969	294	Orejhar, XXIV Sarju River Oudh Temple No. 2	123 56 33 16 49 6	4 363923 3 906460 4 246156	23117 8062 17626	4 378 1 527 3 338	"
283	Rahet, XXII Orejhar, XXIV Fyzabad Great Dome	16 41 27 53 27 25	4 285489 4 732231 4 800685	19297 53980 63195	3 655 10 223 11 969	295	Belua Bazar Sarju River Maranadi	112 47 7	4 430423 4 641229 4 408439	26942 43775 25612	5 103 8 291 4 851	"
284	Orejhar, XXIV Fyzabad Great Dome Darsanganj	83 23 52 68 55 35	4 312662 3 682508 4 285489	20543 9605 19297	3 891 1 819 3 655	296	Oudh Temple No. 1 Sarju River Maranadi	159 12 56 9 4 51	4 430423 4 673299 4 321434	26942 47130 20962	5 103 8 291 3 970	"
285	Orejhar, XXIV Darsanganj Oudh Temple No. 1	148 31 39 11 12 13	4 160642 3 731362 3 982508	14476 5387 9605	2 742 1 020 1 819	297						

J. B. N. HENNESSEY.

In charge of Computing Office.

September 1879.

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL,
 PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

23—N.

† Of the North-East Longitudinal Series. * Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
BARGAWA h.s. Kasda, II Dibar Panjerio Hill Mark	83 86 87	BHAKAPURWA h.s. Matura Tikor, V Lalganj Pagoda	172 172 179 173	CHAPRI, XXIX* Tatpahar Tatpahar Hill Mark Baragaon Kumeria Peak Pakera Basai Gopat Adhesar Hill Mark Murchia, I Urkutia Hill Mark Gurdari Hill Mark Jiawan Hill Mark Tendua Pokra, XXXI* Siwar	68 70 89 67 78 73 85 1 63 65 61 83 1 66	BARGAWA h.s. Kasda, II Dibar Panjerio Hill Mark	83 86 87
BARIPUR, VII Misrapur Shiwala Ganges River No. 32 Meja, VI Ganges River No. 30 Bankata Shiwala Ganges River No. 26 Ganeshpur, VIII Seona, IX Ganges River No. 34 Ganges River No. 45 Ganges River No. 33 Tikor, V	250 219 7 217 249 217 8 9 221 163 220 7	BILAUHI h.s. Jigni Baragaon Kodali Hill Mark Khamerji Kesra Hill Mark Baraiha (F) Tree Flag Hanumana Rock Sabalai Baisaur Rock Katra, IV Naun Hill Mark Murchia, I Naun Temple Birohi Rock	122 117 127 117 99 120 129 118 131 119 123 119 128 124	DAIA s. Majgaon Hill Mark Mugarikot Katra, IV Katra Pass	141 140 140 143	BARIPUR, VII Misrapur Shiwala Ganges River No. 32 Meja, VI Ganges River No. 30 Bankata Shiwala Ganges River No. 26 Ganeshpur, VIII Seona, IX Ganges River No. 34 Ganges River No. 45 Ganges River No. 33 Tikor, V	250 219 7 217 249 217 8 9 221 163 220 7
BASAI GOPAT h.s. Chapri, XXIX* Murchia, I	73 73	BIRUA, X Ranapura, XII Marar, XI Seona, IX Ganeshpur, VIII	124 126 124 128 125	DARAUL h.s. Kohrar Kohrar Temple Meja, VI	159 161 159	BASAI GOPAT h.s. Chapri, XXIX* Murchia, I	73 73
BEJWA BAZAR s. Saru River Orejhar, XXIV Oudh Temple No. 1 Maranadi	291 290 290 295	BISAU, XXIII Nansa, XXI Rabet, XXII Orejhar, XXIV Kumeria, XXV	185 8 30 02 222 15 57 71 289 28 6 58 352 29 57 86	DARSANGANJ s. Fyzabad Great Dome Fyzabad Dome Orejhar, XXIV Oudh Temple No. 1	284 288 284 285	BEJWA BAZAR s. Saru River Orejhar, XXIV Oudh Temple No. 1 Maranadi	291 290 290 295
BHAWANIPUR h.s. Bargawa Tikor, V Mohari Pandipura Ganges River No. 45 Ganges River No. 47 Mirzapur Bungalow Mirzapur Court House Dhanwadi Temple Mirzapur Cantonment Pana Deopura Rajapur Dibar	89 167 49 46 48 57 53 52 47 55 44 41 43 39	BISPATIA s. Marar, XI Newada, XIII Ketulpur Machishahr	19 30 12 63 72 15 59 42 128 40 19 91 187 9 7 71 50 55 57 130 57 31 268 25 59 322 42 41	DEOPURA h.s. Bargawa Bhawaniapur Pana Barani Temple Raja Talao Temple Dibar	40 41 44 58 59 40	BHAWANIPUR h.s. Bargawa Tikor, V Mohari Pandipura Ganges River No. 45 Ganges River No. 47 Mirzapur Bungalow Mirzapur Court House Dhanwadi Temple Mirzapur Cantonment Pana Deopura Rajapur Dibar	89 167 49 46 48 57 53 52 47 55 44 41 43 39
		CHANDAS h.s. Majgaon Hill Mark Kohrar Meja Meja, VI	16 13 37 106 15 18 248 10 21 263 58 35	DIBAR h.s. Panjerio Hill Mark Pokra, XXXI* Bargawa Bhawaniapur Rajapur Deopura	37 36 36 39 42 40		

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

AZIMUTHS OF STATIONS AND INTERSECTED POINTS.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
DOPAP, XVII	"	GANGES RIVER No. 12 s.	"	GANGES RIVER No. 18 s.	"	GANGES RIVER No. 17 s.	"
Saifabad, XV	1 6 42.64	Ganges River No. 13	17	Ganges River No. 17	196	Ganges River No. 17	202
Newa, XVI	59 13 18.40	Dia Shiwala	17	Do.	243	Do.	202
Sirwara, XVIII	124 22 18.91	Ganges River No. 11	18	Ganges River No. 19	194	Do.	203
Kapradi, XIX	177 27 30.38	Do.	19	Do.	244	Do.	204
GANESHPUR, VIII		Kukra Shiwala		GANGES RIVER No. 19 s.			
Birua, X	172 30 39.86	Ganges River No. 15	10	Ganges River No. 18	199		203
Seona, IX	230 47 27.80	Do.	9	Do.	197		203
Baripur, VII	288 38 30.82	GANGES RIVER No. 13 s.	8	Do.			205
Meja, VI	356 14 10.79	Ganges River No. 11	8	Do.	195		204
GANGES RIVER No. 7 s.		Do.			195		
Moia	46 16 7	Kukra Shiwala	187	GANGES RIVER No. 20 s.			204
Jhutsi	127 43 59	Ganges River No. 12	187	Ganges River No. 18	245		204
Ganges River No. 8	354 52 23	Do.	188	Do.	196		205
GANGES RIVER No. 8 s.		Do.			198		205
Lowana Tree	23 54 36	GANGES RIVER No. 14 s.	241	Do.	197		206
Ganges River No. 9	26 55 47	Ganges River No. 13	190	GANGES RIVER No. 21 s.			205
Moia	93 23 15	Do.	188	Ganges River No. 20	197		205
Jhutsi	148 52 29	Garaia Shiwala	189	Do.	246		207
Ganges River No. 7	174 52 26	Ganges River No. 15	188	Do.	198		206
Do.	294 40 55	Damdama Shiwala	191	Do.	247		
Do.	335 17 1	Ganges River No. 16	192		200		
GANGES RIVER No. 9 s.		Do.			201		
Moia	148 56 27	GANGES RIVER No. 15 s.	190	GANGES RIVER No. 22 s.			209
Ganges River No. 8	206 55 29	Damdama Shiwala	190	Ganges River No. 25			206
Do.	261 31 14	Ganges River No. 14	191	Do.	No. 20		206
Do.	318 18 12	Garaia Shiwala	193	Do.	No. 21		207
GANGES RIVER No. 10 s.		Ganges River No. 13		Do.	No. 23		207
Munia	0 31 56	Do.	192	Do.	No. 24		208
Ganges River No. 9	81 32 26	GANGES RIVER No. 16 s.	191	GANGES RIVER No. 23 s.			210
Do.	114 41 49	Ganges River No. 17	191	Ganges River No. 25			207
Do.	304 20 6	Do.	194	Do.	No. 22		207
Do.	324 48 42	Damdama Shiwala	195	Do.	No. 21		211
Dia Shiwala	330 49 49	Ganges River No. 15	242	Do.	No. 26		208
GANGES RIVER No. 11 s.		Do.			No. 24		
Ganges River No. 9	138 19 23	GANGES RIVER No. 17 s.	193	GANGES RIVER No. 24 s.			212
Do.	155 17 54	Ganges River No. 14	192	Ganges River No. 27			209
Do.	180 31 55	Do.	192	Do.	No. 25		208
Kukra Shiwala	201 36 14	Damdama Shiwala	244	Do.	No. 22		208
Ganges River No. 12	244 25 20	Ganges River No. 15	194	Do.	No. 23		211
Do.	264 46 21	Do.	195	Do.	No. 26		215
Dia Shiwala	271 49 40	Do.	242	Do.	No. 30		214
				Do.	No. 29		213

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
GANGES RIVER No. 25 s. Ganges River No. 27 Do. No. 22 Do. No. 23 Do. No. 24	212 209 210 209	GANGES RIVER No. 34 s. Ganges River No. 33 Do. No. 31 Do. No. 35	221 221 222 222	GANGES RIVER No. 42 s. Ganges River No. 39 Do. No. 41 Do. No. 43 Do. No. 44 Do. No. 45	229 229 230 231 232
GANGES RIVER No. 26 s. Ganges River No. 30 Do. No. 24 Do. No. 23 Do. No. 31 Do. No. 32	216 211 211 217 218	GANGES RIVER No. 35 s. Ganges River No. 36 Do. No. 33 Do. No. 34 Do. No. 38 Do. No. 37	223 222 222 225 224	GANGES RIVER No. 43 s. Ganges River No. 44 Do. No. 42 Do. No. 41 Do. No. 46 Do. No. 45	231 230 230 233 232
GANGES RIVER No. 27 s. Ganges River No. 25 Do. No. 24 Do. No. 28	212 212 213	GANGES RIVER No. 36 s. Ganges River No. 33 Do. No. 35 Do. No. 37	223 223 224	GANGES RIVER No. 44 s. Ganges River No. 42 Do. No. 43 Do. No. 46	231 231 234 234
GANGES RIVER No. 28 s. Ganges River No. 27 Do. No. 24 Do. No. 29	213 213 214	GANGES RIVER No. 37 s. Ganges River No. 36 Do. No. 35 Do. No. 38 Do. No. 39	224 224 225 226	Moia N. Shiwala Moia S. Shiwala Ganges River No. 49 Do. No. 47 Shioper House	254 256 288 235 252
GANGES RIVER No. 29 s. Ganges River No. 28 Do. No. 24 Do. No. 30	214 214 215	GANGES RIVER No. 38 s. Ganges River No. 37 Do. No. 35 Do. No. 40 Do. No. 39	225 225 227 226	GANGES RIVER No. 45 h.s. Siwara Mohari Tikor, V Mara Bast Kataia Hill Pagoda Ganges River No. 31 Do. No. 42 Do. No. 43	164 49 163 174 185 163 232 232
GANGES RIVER No. 30 s. Ganges River No. 24 Do. No. 26 Bankata Shiwala Ganges River No. 31 Misrapur Shiwala Ganges River No. 32 Do. No. 29	215 215 216 249 217 250 218 215	GANGES RIVER No. 39 s. Ganges River No. 37 Do. No. 38 Do. No. 40 Do. No. 41 Do. No. 42	226 226 227 228 229	Khamaria Shiwala Ganges River No. 46 Do. No. 48 Mirzapur Cantonment Moia N. Shiwala Mirzapur Church Mirzapur Court House Ganges River No. 49 Paua Bhawapur Pandipura	253 233 237 55 254 186 52 238 48 48 166
GANGES RIVER No. 31 s. (Same as Barapur, VII, which see.)		GANGES RIVER No. 40 s. Ganges River No. 38 Do. No. 41 Rampur Shiwala Ganges River No. 39	227 228 251 227	GANGES RIVER No. 46 s. Bindhachal Shiwala Ganges River No. 47 Do. No. 45 Do. No. 44 Do. No. 43	257 235 233 234 233
GANGES RIVER No. 32 s. Ganges River No. 30 Do. No. 26 Do. No. 31 Do. No. 33	218 218 219 220	GANGES RIVER No. 41 s. Ganges River No. 42 Rampur Shiwala Ganges River No. 39 Do. No. 40 Do. No. 43	229 251 228 228 230		
GANGES RIVER No. 33 s. Ganges River No. 32 Do. No. 31 Do. No. 36	220 220 221 222 223				

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
GANGES RIVER No. 46 s. Khámárá Shiwála Ganges River No. 48 s.	253 236	HAUD s. Bárádári Dome Daríba Temple Isápur Temple Jaunpur Masjid Dome Jaunpur Fort	279 280 281 278 278	KAMPUR s. Saráia Ketulpur Jagdishpur Barauli	266 266 268 267	KAMPUR s. Saráia Ketulpur Jagdishpur Barauli	266 266 268 267
GANGES RIVER No. 47 s. Shioper House Ganges River No. 44 Do. No. 46 Do. No. 48 Moia S. Shiwála Ganges River No. 49 Mirzapur Large Shiwála Paua Bhawánpur	252 235 235 236 236 239 238 57 57	JAGDISHPUR s. Barauli Kámpur Jaunpur Masjid Spire Jaunpur Fort	268 268 271 269	KAPAR h.s. Bauráni Tatpahár	82 82	KAPAR h.s. Bauráni Tatpahár	82 82
GANGES RIVER No. 48 s. Bindháchal Shiwála Ganges River No. 47 Do. No. 45 Do. No. 46 Mirzapur Church Mirzapur Great Shiwála Ganges River No. 49	257 236 237 236 240 239 239	JAMÁURA, III Murchia, I Adhesar Hill Mark Chamnia, Hill Mark Kálapátri Hill Mark Katra, IV Tikor, V Kasda, II	3 108 110 114 4 5 3	KAPRADI, XIX Sirwála, XVIII Rarauli, XX Nansa, XXI Dopáp, XVII	19 20 21 19	KAPRADI, XIX Sirwála, XVIII Rarauli, XX Nansa, XXI Dopáp, XVII	19 20 21 19
GANGES RIVER No. 49 s. Mirzapur Large Shiwála Ganges River No. 45 Do. No. 47 Do. No. 44 Moia N. Shiwála Ganges River No. 48 Mirzapur Church Mirzapur Great Shiwála	258 238 239 238 255 239 240 259	JAUNPUR Fort s. X A Barauli Bárádári Dome Jagdishpur Daríba Temple Haud Jaunpur Masjid Dome Jaunpur Masjid Spire Isápur Temple Jaunpur Church Jaunpur Jail	275 273 269 279 269 280 278 270 272 281 277 276	KARBARA s. Murda Hill Temple Pahári Baragaon Tatpahár	97 96 95 95	KARBARA s. Murda Hill Temple Pahári Baragaon Tatpahár	97 96 95 95
GURUNAGAR, XXX Saibara, XLIII * Bansidíla, XLV * Mánápára, XXIX Kopa, XXVIII	32 31 30 30	JHUSI s. Moia Ganges River No. 7 Do. No. 8 Lowana Tree	187 187 189 241	KASDA, II Bagdari Hill Mark Pokra, XXXI † Ándera Peak Cheropahár Peak Deori Sohía Mark Sanderipahár Hill Mark Urkutia Hill Mark Bargawa Murchia, I Adhesar Hill Mark Jamaura, III	60 2 74 76 71 69 62 83 2 104 3	KASDA, II Bagdari Hill Mark Pokra, XXXI † Ándera Peak Cheropahár Peak Deori Sohía Mark Sanderipahár Hill Mark Urkutia Hill Mark Bargawa Murchia, I Adhesar Hill Mark Jamaura, III	60 2 74 76 71 69 62 83 2 104 3
HANUMANA ROCK s. Baraiha(?) Tree Flag Bansur Rock Katra, IV Bilauli	129 131 130 129	JIGNT h.s. Kodali Hill Mark Baraiha(?) Tree Flag Bilauli Birohi Rock	126 122 122 124	KATAIA HILL PAGODA s. Ganges River No. 45 Pándipura	185 185	KATAIA HILL PAGODA s. Ganges River No. 45 Pándipura	185 185
				KATRA, IV Bilauli Kháméri Hanumana Rock	119 80 130	KATRA, IV Bilauli Kháméri Hanumana Rock	119 80 130

* Of the North-East Longitudinal Series. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
KATRA, IV Baraiha (?) Tree Flag Majgaon Hill Mark Bakshipahar Hill Mark Katra Pass Daia Kohrar Karaun Fort Meja, VI Mara Temple Mara Dome Mugarikot Tikor, V Baraunda Bridge Baraunda Jamaura, III Garbara Temple Murli Chalinga Hill Mark Kalapatri Hill Mark Chauria Hill Mark Murchia, I Naun Hill Mark	121 138 148 142 140 152 149 6 181 177 135 5 146 147 4 133 112 136 114 110 4 123	KHAMERJI h.s. Machir Sabkalai Nagrai Rock Katra, IV Bilauhi Taripater Rock Paragaon Murchia, I Pahari Bautrani KOHRAI h.s. Bakshipahar Hill Mark Ramnagar Temple Kohrar Temple Daraul Meja, VI Chandas Katra, IV KOPA, XXVIII Gurunagar, XXX Manapara, XXIX Sabaijot, XXVII Tikera, XXVI KUMERIA, XXV Bisaul, XXIII Orejhar, XXIV Tikera, XXVI Sabaijot, XXVII LALGANJ h.s. Tulsipur Pagoda Pandipura Siwara MACHIR h.s. Khamerji Mau Temple Mau Rock Nagrai Rock MACHLISHAHR s. Marar, XI Bispatia Ketulpur Saralia	106 116 98 80 117 101 88 80 91 81 153 162 160 159 152 154 152 30 29 28 28 25 25 26 27 170 169 169 106 107 109 106 263 263 264 265	MANAPARA, XXIX Kopa, XXVIII Gurunagar, XXX Bansidila, XLV* Sabaijot, XXVII MARA EAST h.s. Kusalpurwa Mark Mara Dome Mara Temple Mara West Bharatganj Pagoda Birpur Hill Pagoda Ganges River No. 45 Tikor Hill Mark Tikor, V MARA WEST h.s. Mara Temple Bharatganj Pagoda Birpur Hill Pagoda Mara East MARANADI s. Saru River Oudh Temple No. 1 Belua Bazar MARAR, XI Sathar Birua, X Ramapura, XII Newada, XIII Bispatia Machlishahr Seona, IX MATRA s. Tikor, V Bhikapurwa Siwara Lalganj Pagoda MAU ROCK s. Kesra Hill Mark Machir Khamerji	29 30 31 29 175 176 180 182 183 184 174 178 174 182 183 184 182 295 296 295 260 11 12 13 262 263 11 171 172 171 173 108 109 108
KATRA DAK BUNGALOW s. Katra Pass Mugarikot KATRA PASS s. Daia Katra Patrol's Bungalow Katra Dak Bungalow Mugarikot Katra, IV KATRA PATROL'S BUNGALOW s. Katra Pass Mugarikot KETULPUR s. Machli Shahr Bispatia Kampur Saralia KHAMERJI h.s. Patpara Kesra Hill Mark Mau Rock	145 145 143 144 145 142 144 144 264 264 266 265 93 99 108	h.s. 44 33 55 " 358 14 25 s. 141 6 47 " 220 58 0 " 224 33 9 " 232 51 3 314 21 36 " 40 58 28 " 261 9 14 s. 23 29 11 " 88 28 47 " 274 44 20 " 325 0 37 h.s. 24 32 52 79 38 54 s. 165 0 47	145 145 143 144 145 142 144 144 264 264 266 265 93 99 108	MANAPARA, XXIX Kopa, XXVIII Gurunagar, XXX Bansidila, XLV* Sabaijot, XXVII MARA EAST h.s. Kusalpurwa Mark Mara Dome Mara Temple Mara West Bharatganj Pagoda Birpur Hill Pagoda Ganges River No. 45 Tikor Hill Mark Tikor, V MARA WEST h.s. Mara Temple Bharatganj Pagoda Birpur Hill Pagoda Mara East MARANADI s. Saru River Oudh Temple No. 1 Belua Bazar MARAR, XI Sathar Birua, X Ramapura, XII Newada, XIII Bispatia Machlishahr Seona, IX MATRA s. Tikor, V Bhikapurwa Siwara Lalganj Pagoda MAU ROCK s. Kesra Hill Mark Machir Khamerji	29 30 31 29 175 176 180 182 183 184 174 178 174 182 183 184 182 295 296 295 260 11 12 13 262 263 11 171 172 171 173 108 109 108

* Of the North-East Longitudinal Series.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
PARIPURA, XIV Rāmapura, XII Nawa, XVI Saitabad, XV Newāda, XIII	14 16 15 14	RAJAPUR h.s. Bargawa Bhawānpur Pana Kusāhi Temple Dibar	42 43 45 51 42	SARJU RIVER s. Orejāh, XXIV Oudh Temple No. 1 Oudh Temple No. 2 Belua Bazar Marānadi	291 292 294 291 295
PARSA s. Murchia, I Adhesar Hill Mark	105 105	RAMAPURA, XII Birua, X Paripura, XIV Newāda, XIII Marār, XI	12 14 13 12	SATHAR s. Marār, XI Sarāi Masjid Seona, IX	260 261 260
PATPARA h.s. Khāmerji Pahāri Tatpāhār	93 93 94	RAJAPUR, XX Sirwāra, XVIII Rāhet, XXII Nansa, XXI Kapradī, XIX	20 22 21 20	SEONA, IX Ganeshpur, VIII Birua, X Sathar Sarāi Masjid Marār, XI Baripur, VII	9 10 260 261 11 9
PATA h.s. Bhawānpur Pāndipura Ganges River No. 45 Do. No. 47 Mirzapur Bungalow Barāni Temple Rāja Takāo Temple Kusāhi Temple Deopura Rājapur	44 46 48 57 54 58 59 51 44 45	SABANJOT, XXVII Kumeria, XXV Tikeria, XXVI Kopa, XXVIII Mānapāra, XXIX	27 27 28 29	SIRAWAL h.s. Murchia, I Sanderipahār Hill Mark Gurdari Hill Mark	86 86 87
POKRA, XXXI* Chapri, XXIX* Jiawan Hill Mark Gurdari Hill Mark Adhesar Hill Mark Murchia, I Deori Sohā Mark Tendua Bargawa Cheropahār Peak Amdera Peak Kasda, II Dibar Panjerio Hill Mark Bagdari Hill Mark	1 61 64 35 1 72 33 34 77 75 2 36 38 60	SABKALAI h.s. Khāmerji Balsaur Rock Bilauhi Baragaon SAIBARA, XLIII+ Bansidila, XLV+ Gurūnagar, XXX	116 132 118 116 32 32	SIRWARA, XVIII Nawa, XVI Rarauli, XX Kapradī, XIX Dopāp, XVII SIWAR s. Chapri, XXIX* Kumeria Peak Gurdari Hill Mark	18 20 19 18 66 67 66
RAHET, XXII Rarauli, XX Mao Temple Fyzabad Great Dome Orejāh, XXIV Bisaul, XXIII Nansa, XXI	22 282 283 24 23 22	SAIFABAD, XV Newāda, XIII Paripura, XIV Nawa, XVI Dopāp, XVII SARATA s. Machishahr Ketulpur Kāmpur Barauli	15 15 16 17 265 265 266 267	SIWARA h.s. Matura Tikar, V Lālganj Tulsiur Pagoda Ganges River No. 45 Pāndipura SUGRIMGARI Tomb s. Fyzabad Great Dome Fyzabad Dome Orejāh, XXIV	171 164 169 170 164 165 286 287 286

GURWANI MERIDIONAL SERIES.

CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— λ stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically, H_s for the Height when found by spirit leveling, and h for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of λ and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c., secondary stations by the letters h.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>A s. (<i>Jaunpur</i>) On mound, about $\frac{1}{2}$ a mile S. of Umarpur and at the same distance W. of Jaunpur cantonment.</p> <p style="text-align: center;">o ' "</p> <p>λ 25 44 00.07 L 82 43 21.19 Nos. 273, 274</p>	<p>Amlauti Tree Flag. (<i>Allahabad</i>) In old fort.</p> <p style="text-align: center;">o ' "</p> <p>λ 25 19 5 L 82 11 54</p>	<p>Bahádurgarh Fort s. (<i>Allahabad</i>) Near Nim tree in old fort, 0.8 of a mile N.E. of Harbaupur and 1.1 miles S.E. of Surwadi village.</p> <p style="text-align: center;">o ' "</p> <p>λ 25 35 57.08 L 82 10 57.72</p>
<p>a s. (<i>Fyzabad</i>) On bank of a small nadi, about $1\frac{1}{2}$ miles N.E. of Orejhar principal station, $\frac{2}{3}$ of a mile N. of road from Tanda to Oudh and $\frac{1}{2}$ of a mile S.E. of Oudh city.</p> <p>λ 26 47 29.91 L 82 15 30.22 No. 289</p>	<p>Badra Sayyid's Tomb. (<i>Allahabad</i>)</p> <p>λ 25 27 16 L 81 57 13</p>	<p>Baisaur Rock s. (<i>Mirzapur</i>) On E. side of the high road to Mau, 0.8 of a mile N.E. of the village so called and 1.6 miles S. of Lauridar.</p> <p>λ 24 49 30.11 L 82 10 6.71 Nos. 131, 132</p>
<p>Adhesar Hill Mark. (<i>Mirzapur</i>) On a detached hill N. of the Kaimur range called Adhesar Fort, about $1\frac{1}{2}$ miles S.E. of Jarkul Lower and $2\frac{1}{2}$ miles S.W. of Baruhau village.</p> <p>λ 24 37 37.04 L 82 21 23.05 Nos. 35, 103, 104</p>	<p>Bagdara s. (<i>Baghelkhand, Rewah State</i>) On pagoda, 11.2 feet S. of the spike, about $\frac{1}{2}$ a mile S.E. of village of the same name and at the same distance N.E. of Károun.</p> <p>λ 24 38 2.97 L 82 32 19.49</p>	<p>Bakshipahár Hill Mark. (<i>Baghelkhand, Rewah State</i>) On the highest point of hill E. of Sohági village.</p> <p>λ 24 57 56.05 L 81 48 14.44 No. 148</p>
<p>Ámdera Peak. (<i>Baghelkhand, Rewah State</i>) Appertaining to the great range running N.E. from Gurdari Hill Mark.</p> <p>λ 24 27 17 L 82 35 6 Nos. 74, 75</p>	<p>Bagdari Hill Mark. (<i>Baghelkhand, Rewah State</i>) On hill peak in the jungle, 5 miles N.E. of Pokra.</p> <p>λ 24 19 51.21 L 82 35 52.82 No. 60</p>	<p>Banjári Fort s. (<i>Mirzapur</i>) On W. face of old fort, 0.4 of a mile E. of Indrawar village.</p> <p>λ 24 48 46.91 L 82 16 46.04</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Bankāta Shiwāla, (Mirzapur) Spire.</p> <p>λ 25 15 58.4 L 82 17 59.9 No. 249</p> <p>Bansidīla, XLV.* (Vide page 8—N.)</p> <p>λ 27 24 3.24 L 82 19 17.62 H 377 h 20 No. 31</p> <p>Bara s. (Allahabad) On right bank of the Ganges, and N. of village of the same name.</p> <p>λ 25 18 9.48 L 82 11 57.96</p> <p>Bārādari Dome, (Jaunpur) Kalas, situated on right bank of the Gumti river.</p> <p>λ 25 44 51.9 L 82 42 43.0 No. 279</p> <p>Baragaon h.s. (Baghelkhand, Rewah State) On the Kaimūr range, about $\frac{3}{4}$ of a mile N.E. of village of the same name, and 1 mile N.W. of Sajwanah.</p> <p>λ 24 34 48.94 L 82 9 30.74 Nos. 88, 89, 90</p> <p>Baragaon Temple. (Baghelkhand, Rewah State) White temple W. of village.</p> <p>λ 24 58 28.1 L 81 48 16.0</p> <p>Baraiha (?) Tree Flag. (Baghelkhand, Rewah State) West of road to Mau.</p> <p>λ 24 45 15 L 82 5 50 Nos. 120, 121</p> <p>Baraini Temple. (Mirzapur) White pointed temple in Mirzapur.</p> <p>λ 25 12 31.6 L 82 43 59.7 No. 58</p> <p>Barauli s. (Jaunpur) On S.W. bastion of an old fort, about $\frac{1}{2}$ of a mile S. of village of the same name, and 1.1 miles S.W. of Sarwarpati.</p> <p>λ 25 42 41.20 L 82 38 27.31 No. 267</p>	<p>Baraunda Bridge s. (Mirzapur) Mark W. of the road, and 20 yards N. of bridge over the Belan river.</p> <p>λ 24 56 56.51 L 82 17 53.99 No. 146</p> <p>Baraunda s. (Mirzapur) On S. bank of the Dherawa tank near road.</p> <p>λ 24 57 11.15 L 82 18 21.81 No. 147</p> <p>Bardi s. (Baghelkhand, Rewah State) Over gateway of fort, on right bank of the Gopat river, about $\frac{1}{4}$ a mile S. W. of village of the same name, and 1 mile N.E. of Sunbarsa.</p> <p>λ 24 32 35.48 L 82 25 0.31 No. 85</p> <p>Bargawa h.s. (Baghelkhand, Rewah State) On the Kaimūr range, $1\frac{1}{2}$ miles N.W. of Harma village, and $2\frac{1}{4}$ miles S.W. of upper Bargawa: the Son river flows $\frac{1}{2}$ a mile south of the station.</p> <p>λ 24 32 40.41 L 82 32 49.29 Nos. 84, 88, 84</p> <p>Baria s. (Mirzapur) On S.E. corner of tank, about $\frac{1}{2}$ a mile S.W. of village of the same name, and at the same distance N.E. of Jhagaha.</p> <p>λ 24 37 25.94 L 82 26 23.85</p> <p>Baripur, VII. (Vide page 5—N.)</p> <p>λ 25 16 32.49 L 82 19 55.18 H_s 320.82† h 30 No. 7</p> <p>Basai Gopat h.s. (Baghelkhand, Rewah State) On a conical hill on the right bank of the Gopat river, and $\frac{1}{2}$ a mile W. of Basai village.</p> <p>λ 24 26 50.68 L 82 16 59.20 No. 73</p> <p>Batawa Building. (Mirzapur)</p> <p>λ 25 8 35.9 L 82 51 15.6</p>	<p>Bautrāni h.s. (Baghelkhand, Rewah State) About $1\frac{1}{2}$ miles W. of Dāuri, and 1 mile N. of Dhornai nadi.</p> <p>λ 24 20 35.96 L 82 1 50.70 No. 81</p> <p>Belan and Aud Junction s. (Mirzapur) On bank.</p> <p>λ 24 54 22.57 L 82 19 4.55</p> <p>Belharia Ghat Flag. (Fyzabad) At Rāja Dasharath's Samādhi.</p> <p>λ 26 42 49 L 82 18 41</p> <p>Belua Bazar s. (Basti) Opposite zamindār's house in village, and $\frac{1}{2}$ a mile N.W. of Hanumanpur; thāna and pargana Amorha.</p> <p>λ 26 48 35.68 L 82 18 15.58 No. 290</p> <p>Bhāratganj Pagoda. (Allahabad) Spire of the largest and N.W. pagoda.</p> <p>λ 25 6 59.3 L 82 18 54.9 No. 183</p> <p>Bhawānīpur h.s. (Mirzapur) Also called Bhowti; on great hill forming S. boundary of the Bind hills.</p> <p>λ 24 59 13.30 L 82 36 21.40 Nos. 89, 167, 168</p> <p>Bhūkāpurwa h.s. (Mirzapur) On flat rocks 150 yards N.E. of the village, about $\frac{1}{4}$ of a mile N.E. of Salura and 2 miles W. of Rānibāri; pargana Kantit.</p> <p>λ 25 3 17.71 L 82 22 58.17 No. 172</p> <p>Bijauli s. (Allahabad) On left bank of the Ganges, and 0.2 of a mile S.E. of the village.</p> <p>λ 25 18 9.98 L 82 15 13.90</p> <p>Bilauhi h.s. (Baghelkhand, Rewah State) On Drummondganj range, N.W. of Naun village.</p> <p>λ 24 46 32.77 L 82 11 6.71 Nos. 117, 118, 119</p>

* Of the North-East Longitudinal Series.

† This height refers to the mark-stone let into the upper surface of the pillar.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Bind Range A s. (Allahabad) On the Bind range, about $\frac{1}{2}$ of a mile N.W. of Kurki village; thána Bháratganj, pargana Khairagarh.</p> <p>o ' "</p> <p>λ 25 7 18.35 L 82 10 59.10</p>	<p>Bisaul, XXIII. (Vide page 7—N.)</p> <p>o ' "</p> <p>λ 26 40 37.38 L 82 23 21.61 H_s 342.00* h 24 No. 23</p>	<p>Daia s. (Allahabad) On staircase of Rája's house, about a mile N.E. of Daia Fort.</p> <p>o ' "</p> <p>λ 24 55 15.68 L 82 8 3.58 Nos. 140, 141</p>
<p>Bind Range B s. (Allahabad) About $\frac{1}{2}$ a mile S.E. of Chapra and at the same distance N. of Urarupur village; thána Bháratganj, pargana Khairagarh.</p> <p>λ 25 7 3.81 L 82 14 27.13</p>	<p>Bispattia s. (Jaunpur) On S. bank of tank adjoining the village so called, about $\frac{1}{2}$ of a mile E. of Boji Sarái village, 0.7 of a mile N.E. of Tarsai, and 1.4 miles S.E. of Sultanpur.</p> <p>λ 25 46 0.67 L 82 23 11.39 No. 262</p>	<p>Damdama Shiwála, (Allahabad) Spiro.</p> <p>λ 25 18 46.3 L 82 7 31.6 Nos. 247, 248</p>
<p>Bind Range C s. (Allahabad) On the Bind range, about 1½ miles N. of Rámpur, and 2½ miles N.W. of Unchadeh village; thána Bháratganj, pargana Khairagarh.</p> <p>λ 25 3 23.54 L 82 13 55.39</p>	<p>Chalinga Hill Mark. (Mirzapur) On N.E. point of a remarkable projection of the Kaimúr range, and 3-miles S.E. of Katra principal station.</p> <p>λ 24 49 6.75 L 82 14 45.87 Nos. 136, 137</p>	<p>Daraul h.s. (Allahabad) On the Bind range, 0.4 of a mile W. of the village so called.</p> <p>λ 25 9 34.11 L 82 6 0.80 No. 159</p>
<p>Bind Range D s. (Allahabad) On the Bind range, about 1½ miles N.W. of Deori; thána Bháratganj, pargana Khairagarh.</p> <p>λ 25 4 39.37 L 82 11 24.93</p>	<p>Chandas h.s. (Allahabad) On Bind hills, about $\frac{1}{2}$ of a mile E. of village of that name, and $\frac{1}{2}$ of a mile N.E. of Bháia.</p> <p>λ 25 6 49.53 L 82 5 45.33 Nos. 154, 155</p>	<p>Dariba Temple, (Jaunpur) Spiro.</p> <p>λ 25 45 33.8 L 82 42 55.7 No. 280</p>
<p>Bindháchal Shiwála, (Mirzapur) Spiro.</p> <p>λ 25 9 48.0 L 82 33 6.6 No. 257</p>	<p>Chandpára Temple. (Allahabad) Spiro of a very remarkable temple.</p> <p>λ 25 29 25.2 L 82 10 8.5</p>	<p>Darsanganj s. (Fyzabad) On tower at W. face of the enclosure wall in the bazar of the same name, and $\frac{1}{2}$ a mile S. of Chirai village.</p> <p>λ 26 45 22.30 L 82 14 55.81 No. 284</p>
<p>Birohi Rock s. (Baghelkhand, Rewah State) On the Drummondganj range, 0.5 of a mile N. of village so called, 1.1 miles S.E. of Misragoon, and 1.6 miles N.E. of Pataira village.</p> <p>λ 24 43 19.15 L 82 11 10.30 Nos. 124, 125</p>	<p>Chapri, XXIX.† (Vide page 3—N.)</p> <p>λ 24 18 46.71 L 82 16 13.30 H 1862 h 3 No. 1</p>	<p>Deopura h.s. (Mirzapur) About 3½ miles S.W. of Rámpur Saktesgarh.</p> <p>λ 24 56 27.54 L 82 49 25.89 Nos. 40, 41</p>
<p>Birpur Hill Pagoda, (Allahabad) Dome.</p> <p>λ 25 8 0.9 L 82 19 37.4 No. 184</p>	<p>Chaunia Hill Mark. (Mirzapur) On E. face of the Drummondganj range and near Debaaur pass. About 2½ miles E.S.E. of Lohri village, and 1½ miles N.N.E. of a paka tank.</p> <p>λ 24 42 31.37 L 82 19 9.48 Nos. 110, 111</p>	<p>Deori Sohía Mark. (Baghelkhand, Rewah State) On a small height, 2 miles N.W. of village of the same name.</p> <p>λ 24 25 28.87 L 82 29 14.21 Nos. 71, 72</p>
<p>Birua, X. (Vide page 5—N.)</p> <p>λ 25 31 19.96 L 82 6 46.77 H 346 h 30 No. 10</p>	<p>Cheropahár Peak. (Baghelkhand, Rewah State) Appertaining to the great range running N.E. from Gurdari Hill Mark.</p> <p>λ 24 27 24 L 82 33 23 Nos. 76, 77</p>	<p>Dhamawa Temple. (Fyzabad)</p> <p>λ 26 47 7.2 L 82 1 31.4</p>
		<p>Dhanipur Factory, (Allahabad) Eastern chimney of Mr. Griffith's factory.</p> <p>λ 25 17 45 L 82 8 35</p>

* This height refers to the upper mark-stone of the tower and was determined as follows. The point levelled to was on a paka brick imbedded in earth down the N.W. side of the column of which the height = 326.16 feet and to this was added 15.84 feet (the height of the upper mark-stone of tower above this brick).
† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station, district, description, • co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Dhanwāli Temple. (Mirzapur) S. of village of the same name: " " "</p> <p>λ 25 2 41.9 L 82 36 43.9 No. 47</p> <p>Dia Shiwāla, (Allahabad) Spire. λ 25 19 7.1 L 82 2 9.8 Nos. 242, 243</p> <p>Dibar h.s. (Mirzapur) About 2½ miles N.E. of Purwa, and 1½ miles N. of Khadra village. λ 24 38 25.06 L 82 55 11.50 No. 36</p> <p>Dopāp, XVII. (Vide page 6—N.) λ 26 10 42.83 L 82 19 10.73 H 334 h 24 No. 17</p> <p>Fyzabad Dome, (Fyzabad) Of Sirāj-Ud-daula's tomb. λ 26 46 46.6 L 82 11 59.4 Nos. 287, 288</p> <p>Fyzabad Great Dome. (Fyzabad) Or Queen's tomb. λ 26 45 56.3 L 82 11 12.3 No. 283</p> <p>Fyzabad Masjid, (Fyzabad) N. minaret. λ 26 47 0.5 L 82 12 23.2</p> <p>Fyzabad Masjid, (Fyzabad) S. minaret. λ 26 46 59.9 L 82 12 23.3</p> <p>Ganeshpur, VIII. (Vide page 5—N.) λ 25 20 4.76 L 82 8 24.59 H 323.78* h 3.0 No. 8</p>	<p>Ganges River No. 7 s. (Allahabad) Also called Nika s.; on N. bund of a tank, 0.3 of a mile S.E. of village of the same name, 1 mile off the left bank of the Ganges, and 0.4 of a mile E. of Chhatnagh village. λ 25 24 35.38 L 81 57 56.51 No. 187</p> <p>Ganges River No. 8 s. (Allahabad) Also called Nimbi No. 1 s.; on N. bank, close to it the river forms two channels, the larger of which flows under Lowanna and the smaller by the station, 0.7 of a mile W. of village of the same name. Marked by a mound 3 feet in height. λ 25 23 14.54 L 81 58 4.49 Nos. 188, 189</p> <p>Ganges River No. 9 s. (Allahabad) Also called Lowanna s. or Lowen s.; on right bank, about 50 yards N. of village of the same name, and 1½ miles E. of the Grand Trunk Road from Mirzapur to Allahabad. λ 25 21 59.47 L 81 57 22.52 No. 190</p> <p>Ganges River No. 10 s. (Allahabad) Also called Chebala s.; on ruins of a Garhi on N. bank, 0.3 of a mile S. of the village so called, and 0.7 of a mile S.E. of Sihora. λ 25 22 22.13 L 82 0 9.99 Nos. 191</p> <p>Ganges River No. 11 s. (Allahabad) Also called Munia s.; on right bank, 0.3 of a mile S.E. of village of the same name. λ 25 19 10.60 L 82 0 8.04 Nos. 192, 193</p> <p>Ganges River No. 12 s. (Allahabad) Also called Hindūpura s.; on a small height E. of village of that name which is composed of half a dozen of straw-built houses. It is situated a little above the confluence of two channels of the river formed near Nimbi. λ 25 20 29.98 L 82 3 10.63 No. 194</p> <p>Ganges River No. 13 s. (Allahabad) Also called Dia s.; on S. bank and at N. extremity of village of the same name. A platform 4 feet in height denotes the station. λ 25 19 22.34 L 82 2 29.48 Nos. 195, 196</p>	<p>Ganges River No. 14 s. (Allahabad) Also called Babura s.; on right bank, 0.5 of a mile N.W. of village of the same name, 0.8 of a mile E. of Kotaha, and 0.7 of a mile S. of Kajuraha village. Marked by a mound of earth 6 feet in height. λ 25 18 21.94 L 82 5 23.98 No. 197</p> <p>Ganges River No. 15 s. (Allahabad) Also called Ganeshpur s.; about 500 yards N.N.W. of principal station of the same name, ¼ of a mile E. of Ganeshpur village, and 1 mile S. W. of Katha: a nala is about 100 yards W. of the station. λ 25 20 10.22 L 82 8 12.67 Nos. 198, 199</p> <p>Ganges River No. 16 s. (Allahabad) Also called Dhanipur s.; on N. bank, a made-road from Sirsa to Saidabad passes 0.15 of a mile W., 0.4 of a mile S.W. of Panditpur Mat, 0.2 of a mile S. of the village so called, and 0.5 of a mile N. of Bārpur village. λ 25 18 5.70 L 82 8 29.21 No. 200</p> <p>Ganges River No. 17 s. (Allahabad) Also called Sirsa s.; immediately above S. bank and at E. extremity of the village, about ¼ a mile N. of the Grand Trunk Road from Mirzapur to Allahabad, and at the same distance W. of Chulwa village. λ 25 15 56.81 L 82 8 17.41 No. 201</p> <p>Ganges River No. 18 s. (Allahabad) Also called Pakri Sawār s.; on remains of a mud fort on S. bank of the river flowing at its base, 0.3 of a mile W. of Pakri, 0.2 of a mile N.W. of Sawār, and 0.7 of a mile N.E. of Dubapur. λ 25 17 9.73 L 82 10 26.23 No. 202</p> <p>Ganges River No. 19 s. (Allahabad) Also called Bhainsāsur s.; so called from an image of a buffalo placed there, situated on N.W. angle of fort of the same name, 0.3 of a mile N. of Mowa, 1.0 mile S.E. of Damm Singhpur, and 0.3 of a mile E. of Ahir-ka-purwa. λ 25 18 40.50 L 82 11 8.06 No. 203</p> <p>Ganges River No. 20 s. (Allahabad) Also called Parānīpur s.; on S. bank, 0.5 of a mile N. of the village of that name, and 0.6 of a mile N.W. of Kuraura. Marked by a mound 5 feet in height. λ 25 17 57.64 L 82 12 33.64 No. 204</p>

* This height refers to the mark-stone at 27 feet above the ground i.e. at 3 feet below the original upper surface of the pillar.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Ganges River No. 21 s. (Allahabad) Also called Dachágir s.; on remains of a very remarkable old fort on N. edge of the Ganges, and 0.2 of a mile W. of village of the same name.</p> <p>λ 25 18 57.78 L 82 13 31.77 No. 205</p>	<p>Ganges River No. 28 s. (Allahabad) Also called Mahewa s.; on S. bank of the river and immediately above it, 0.2 of a mile E. of village of the same name, 0.1 of a mile N.W. of Dingarpur, and 0.7 of a mile S. of Tulsī village.</p> <p>λ 25 10 36.50 L 82 16 50.33 No. 213</p>	<p>Ganges River No. 35 s. (Mirzapur) Also called Son-ka-pura s.; on left bank, 0.2 of a mile S. of village of that name, 0.5 of a mile S.W. of Indar, and 0.9 of a mile N. of Simaid. A platform 10 feet high indicates the station.</p> <p>λ 25 15 3.06 L 82 22 46.30 No. 222</p>
<p>Ganges River No. 22 s. (Allahabad) One mile from the right bank, 0.9 of a mile N.E. of Kesopati, and at the same distance E. of Rasauli village. A mound 6 feet high defines the station.</p> <p>λ 25 16 35.44 L 82 14 15.63 No. 206</p>	<p>Ganges River No. 29 s. (Mirzapur) Also called Chachúa s.; on old Garhi W. of village so called, and 200 yards from S. edge of the river.</p> <p>λ 25 11 54.94 L 82 18 47.88 No. 214</p>	<p>Ganges River No. 36 s. (Mirzapur) Also called Gaura s.; the river flows 100 yards N. of the station, the village of Gaura from which it is named lies 0.2 of a mile E.</p> <p>λ 25 12 19.44 L 82 22 45.86 No. 223</p>
<p>Ganges River No. 23 s. (Allahabad) Also called Tela s.; on left bank of and just above the river, about 1/4 of a mile N. of village of the same name, and 3/4 of a mile S. of Kuni. A mound 10 feet high denotes the station; thána Handia, pargana Kiwát.</p> <p>λ 25 17 3.60 L 82 15 59.74 No. 207</p>	<p>Ganges River No. 30 s. (Mirzapur) On left bank, 0.6 of a mile N. of Dig village. A mound 8 feet high marks the station.</p> <p>λ 25 14 50.81 L 82 17 22.19 Nos. 215, 216</p>	<p>Ganges River No. 37 s. (Mirzapur) Also called Nimbi No. 2 s.; on right bank, 0.2 of a mile N. of the village of that name, and the same distance S. of Arjampur. A platform 6 feet high defines the station.</p> <p>λ 25 13 6.46 L 82 24 33.44 No. 224</p>
<p>Ganges River No. 24 s. (Mirzapur) Also called Khemápur s.; on N. bund of a tank between the villages of Khemápur and Sujanganj, from the latter of which it is distant 0.3 of a mile N.W., 1.0 mile S.W. of Chakia, and 1.3 miles N.E. of Dugna village.</p> <p>λ 25 15 13.14 L 82 16 2.64 No. 208</p>	<p>Ganges River No. 31 s. (Same as Barápur VII, which see).</p> <p>No. 217</p>	<p>Ganges River No. 38 s. (Mirzapur) Also called Dhanipati s.; on N. bank, 0.2 of a mile N. of village of the same name, 0.7 of a mile E. of Duhia, and 0.4 of a mile S.W. of Kedarapura.</p> <p>λ 25 15 11.70 L 82 24 40.29 No. 225</p>
<p>Ganges River No. 25 s. (Allahabad) On S. bank, 0.6 of a mile W. of Kanjara, at the same distance N. of Unaur, and 0.8 of a mile E. of Chupor. A platform 10 feet high marks the station.</p> <p>λ 25 14 38.64 L 82 14 12.98 Nos. 209, 210</p>	<p>Ganges River No. 32 s. (Mirzapur) On right bank, 1.2 miles S.W. of Misrapur village. Marked by a platform 3 feet high.</p> <p>λ 25 15 21.22 L 82 18 48.21 Nos. 218, 219</p>	<p>Ganges River No. 39 s. (Mirzapur) Also called Nandni s. or Nandui s.; on a mound on right bank, 0.3 of a mile E. of the village so called, and 0.5 of a mile S.W. of Bamani.</p> <p>λ 25 14 26.12 L 82 26 4.08 No. 226</p>
<p>Ganges River No. 26 s. (Mirzapur) Also called Bankáta s.; on left bank, 0.2 of a mile W. of village of that name. A platform 9 feet in height defines the station.</p> <p>λ 25 16 0.71 L 82 17 33.17 No. 211</p>	<p>Ganges River No. 33 s. (Mirzapur) Also called Dagaui s.; on right bank, 0.1 of a mile S.W. of the village from which the station is named. A platform 6 feet high denotes the station.</p> <p>λ 25 15 13.25 L 82 20 56.42 No. 220</p>	<p>Ganges River No. 40 s. (Mirzapur) Also called Birojpur s.; immediately on N. bank, and 0.4 of a mile E. of Birapur village.</p> <p>λ 25 15 39.29 L 82 26 2.86 No. 227</p>
<p>Ganges River No. 27 s. (Allahabad) Also called Kotri s.; on S. bank of the river and 200 yards from it, 0.2 of a mile S.W. of the village of that name, 0.4 of a mile N.E. of Achola, and 0.8 of a mile E. of Suria village.</p> <p>λ 25 12 57.86 L 82 14 4.38 No. 212</p>	<p>Ganges River No. 34 s. (Mirzapur) On S. bank, 0.7 of a mile N.W. of Ojapura, 0.3 of a mile S.W. of Madanpura, and 0.5 of a mile N.E. of Berwa. A mound 4 feet high indicates the station.</p> <p>λ 25 16 19.44 L 82 21 34.85 No. 221</p>	<p>Ganges River No. 41 s. (Mirzapur) Also called Rámpur s.; on left bank, 0.5 of a mile S.W. of village of the same name, 1.1 miles E. of Golauri, and 0.7 of a mile N.W. of Mahámanpura village. A large pin marks the station.</p> <p>λ 25 15 35.75 L 82 28 12.51 No. 228</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Ganges River No. 42 s. (Mirzapur) On S. bank, 1 mile S.E. of Japau bungalow, 1.1 miles S. of Thanipura, and 1.3 miles W. of Tili village. A platform 6 feet high denotes the station.</p> <p>λ 25 13 14.68 L 82 27 40.75 No. 229</p>	<p>Ganges River No. 49 s. (Mirzapur) Also called Mirzapur s.; on a high house in the city. An iron pin marks the station.</p> <p>λ 25 9 3.04 L 82 36 26.06 Nos. 238, 239</p>	<p>Gogra River No. 118 s. (Fyzabad) Also called Phulpur Village Ghat s.; on right bank, 0.1 of a mile W. of Bachupur, and at the same distance N.E. of Phulpur temple.</p> <p>λ 26 33 11.85 L 82 47 1.15</p>
<p>Ganges River No. 43 s. (Mirzapur) Also called Derwa s.; on N. bank, 0.6 of a mile W. of Gangapura, 0.1 of a mile N.W. of Dubepura, and 0.2 of a mile S.E. of village of the same name. A platform 6 feet high marks the station.</p> <p>λ 25 13 54.88 L 82 30 0.44 No. 230</p>	<p>Garaila Shiwála, (Allahabad) Spire, on right bank of the Ganges.</p> <p>λ 25 19 6.1 L 82 5 22.7 No. 246</p>	<p>Gogra River No. 119 s. (Basti) On left bank, 1.5 miles S.E. of Dubia, 2.3 miles S. of Misraulia, and 1.4 miles S.W. of Bhagautapur.</p> <p>λ 26 34 54.22 L 82 43 42.91</p>
<p>Ganges River No. 44 s. (Mirzapur) On S. bank; a nadi flows 300 yards S. of the station.</p> <p>λ 25 11 35.98 L 82 29 57.56 No. 231</p>	<p>Garbara Temple. (Mirzapur) Spire of white temple.</p> <p>λ 24 49 55.4 L 82 16 23.2 No. 133</p>	<p>Gogra River No. 120 s. (Fyzabad) On right bank, 0.3 of a mile N.W. of a temple, and 0.1 of a mile E. of Samrauna.</p> <p>λ 26 32 38.29 L 82 44 44.72</p>
<p>Ganges River No. 45 h.s. (Mirzapur) Also called Moti Talao h.s.; about 1/2 of a mile S. of the Grand Trunk Road from Mirzapur to Allahabad, 3 miles W. of Kantit, and 1 1/2 miles W. of Kuran village.</p> <p>λ 25 9 37.57 L 82 30 31.89 Nos. 48, 163, 232</p>	<p>Gaura Temple. (Allahabad) On left bank of the Tons river near junction with the Belan.</p> <p>λ 25 2 9.0 L 81 47 51.6</p>	<p>Gogra River No. 121 s. (Fyzabad) Also called Tanda Masjid s.; on right bank, on a masjid in the town of Tanda.</p> <p>λ 26 33 20.37 L 82 42 15.65</p>
<p>Ganges River No. 46 s. (Mirzapur) On N. bank, a branch of the river is 100 yards from the station, the high road from Gopiganj to Mirzapur passes 100 yards N. of it, 2.1 miles S. of Khámária shiwála, 0.7 of a mile S.W. of Pataira, and 0.5 of a mile N. of Misradhal village. A mound 6 feet high defines the station.</p> <p>λ 25 12 36.81 L 82 33 28.92 Nos. 233, 234</p>	<p>Gogra River No. 113* s. (Basti) On left bank, 0.9 of a mile S. of Parmesrapur, and 0.7 of a mile S.E. of Dhusna.</p> <p>λ 26 35 43.76 L 82 51 11.73</p>	<p>Gogra River No. 122 s. (Fyzabad) On right bank, 0.4 of a mile N. of Kukrahi, and 0.8 of a mile S.E. of Mahripur village ghat.</p> <p>λ 26 34 51.66 L 82 40 16.25</p>
<p>Ganges River No. 47 s. (Mirzapur) Also called Bindháchal s.; in centre of roof of the highest house in the city belonging to a pandit; marked by an iron pin.</p> <p>λ 25 9 48.36 L 82 32 55.66 Nos. 57, 235</p>	<p>Gogra River No. 114 s. (Fyzabad) On right bank, 0.1 of a mile N. of Lachipur, and 0.2 of a mile S.E. of Mathia.</p> <p>λ 26 33 39.20 L 82 50 49.20</p>	<p>Gogra River No. 123 s. (Basti) On left bank, 0.9 of a mile S.E. of Tilwa, and 0.6 of a mile S.W. of Gainjot village.</p> <p>λ 26 36 20.23 L 82 41 13.41</p>
<p>Ganges River No. 48 s. (Mirzapur) On N. bank, 1.1 miles N. of Majgaon, 0.7 of a mile S.E. of Sripati, and 1.1 miles W. of Moia factory. A platform 6 feet high marks the station.</p> <p>λ 25 10 50.76 L 82 34 59.63 Nos. 236, 237</p>	<p>Gogra River No. 115 s. (Basti) On left bank, 0.5 of a mile S.E. of Piparia, 0.6 of a mile S. of Chilwanis, and 1.5 miles S.W. of Kudraha village.</p> <p>λ 26 35 19.28 L 82 49 24.74</p>	<p>Gogra River No. 124 s. (Fyzabad) On right bank, 0.2 of a mile N.E. of Rajaur village temple, and 0.3 of a mile E. of Hadzgarh.</p> <p>λ 26 35 58.35 L 82 38 40.17</p>
	<p>Gogra River No. 116 s. (Fyzabad) On right bank, 0.2 of a mile N.W. of Nasirabad.</p> <p>λ 26 33 37.45 L 82 49 9.79</p>	<p>Gogra River No. 125 s. (Basti) On left bank, 1.2 miles S.E. of Gobrahi, and 1 mile W. of Dongarpur Tola.</p> <p>λ 26 38 2.34 L 82 39 15.52</p>
	<p>Gogra River No. 117 s. (Basti) On left bank and S. of Bhurawa.</p> <p>λ 26 34 57.18 L 82 47 3.77</p>	<p>Gogra River No. 126 s. (Fyzabad) On right bank, 0.7 of a mile N.W. of Katargarh, and 0.5 of a mile S.E. of Isadgarj.</p> <p>λ 26 36 21.58 L 82 36 23.71</p>

* The preceding portion of this triangulation will be found in the Co-ordinate List of the Gora Meridional Series and the continuation in that of the Karáa Meridional Series.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Gogra River No. 127 s. (Basti) On left bank, 0.1 of a mile N.W. of Golalpur, 0.3 of a mile E. of Bamanpura, and 0.1 of a mile S. of Lathara.</p> <p>λ 26 38 48.52 L 82 35 58.63</p>	<p>Gogra River No. 136 s. (Basti) On left bank, 0.2 of a mile S.E. of Gokula, 0.7 of a mile S.W. of Sujhaura, and 2.2 miles W. of Hamaipur.</p> <p>λ 26 43 24.82 L 82 23 9.30</p>	<p>Gogra River No. 144 s. (Gonda) On left bank, 1.3 miles N.E. of Mohana Ghat, 0.8 of a mile S.E. of Ibrahimpur, and 0.9 of a mile W. of Katara.</p> <p>λ 26 50 9.87 L 82 14 11.72</p>
<p>Gogra River No. 128 s. (Fyzabad) Also called Salona Ghat s.; on right bank, 0.1 of a mile N.W. of the village of Salona, and 0.2 of a mile S.E. of the Salona masjid in ruins.</p> <p>λ 26 37 27.11 L 82 35 10.02</p>	<p>Gogra River No. 137 s. (Fyzabad) Also called Marana Village s.; on right bank, in the large village of Marana.</p> <p>λ 26 42 2.28 L 82 20 30.87</p>	<p>Gogra River No. 145 s. (Fyzabad) On right bank.</p> <p>λ 26 47 54.61 L 82 12 31.01</p>
<p>Gogra River No. 129 s. (Basti) On left bank, 2.5 miles S.E. of Amaniganj, and 2.2 miles S.W. of Gaura.</p> <p>λ 26 40 8.25 L 82 33 30.38</p>	<p>Gogra River No. 138 s. (Basti) On left bank, 0.4 of a mile N.W. of Duhua or Purachatán, 0.3 of a mile S.E. of Kajipur, and 0.5 of a mile S.W. of Bhartapur.</p> <p>λ 26 44 55.34 L 82 20 11.17</p>	<p>Gogra River No. 146 s. (Gonda) On left bank, 0.6 of a mile S.E. of Jaitpur Tola, 1.4 miles S. of Bismampur, and 0.8 of a mile S.W. of Birapur.</p> <p>λ 26 50 12.13 L 82 11 24.68</p>
<p>Gogra River No. 130 s. (Fyzabad) On right bank, 0.6 of a mile S.E. of Karamgarh.</p> <p>λ 26 38 22.64 L 82 31 55.94</p>	<p>Gogra River No. 139 s. (Fyzabad) On right bank, 0.4 of a mile S. of Rámpur, and 0.7 of a mile N. of Saráia.</p> <p>λ 26 43 49.77 L 82 16 55.60</p>	<p>Gogra River No. 147 s. (Gonda) On left bank, 0.6 of a mile E. of Kanaujapura, and 1.2 miles N.W. of Guptar ferry-ghat.</p> <p>λ 26 49 17.43 L 82 8 43.65</p>
<p>Gogra River No. 131 s. (Basti) On left bank, 0.2 of a mile E. of Subhika, 0.5 of a mile S.E. of Kataria, and 0.8 of a mile S. of Banjaria.</p> <p>λ 26 40 31.17 L 82 31 15.33</p>	<p>Gogra River No. 140 s. (Basti) On left bank, 0.2 of a mile S. of Misraulia, 0.4 of a mile S.W. of Kanakpur, and 0.4 of a mile N.W. of Chaura.</p> <p>λ 26 46 20.31 L 82 18 31.87</p>	<p>Gogra River No. 148 s. (Fyzabad) On right bank, 1 mile S.W. of Salarpur.</p> <p>λ 26 46 8.49 L 82 8 37.72</p>
<p>Gogra River No. 132 s. (Fyzabad) On right bank, 0.2 of a mile W. of Sujampur, and 1.2 miles E. of Muniar Bazar.</p> <p>λ 26 38 25.12 L 82 29 48.75</p>	<p>Gogra River No. 141 s. (Fyzabad) On right bank, S.W. of Para and E. of Tihura.</p> <p>λ 26 45 30.51 L 82 16 4.95</p>	<p>Gogra River No. 149 s. (Gonda) Also called Panipurwa s.; on left bank, 1.5 miles S.E. of Dalikpurwa, at the same distance S. of Bairágpur, and 0.7 of a mile N.E. of Tul-sipur ferry.</p> <p>λ 26 48 16.32 L 82 6 36.67</p>
<p>Gogra River No. 133 s. (Basti) On left bank, 0.4 of a mile N. of Asogpur, 1.2 miles S.E. of Laharbardihia, and 0.3 of a mile S. of Akumpur.</p> <p>λ 26 40 37.53 L 82 28 52.50</p>	<p>Gogra River No. 142 s. (Basti) Also called Belua Bazar s.; on left bank, 1.1 miles S.E. of Agaganj Bazar, 0.4 of a mile S.W. of Rámpur, and 0.5 of a mile N.W. of Hanu-mánpur Bazar.</p> <p>λ 26 48 34.88 L 82 18 15.29</p>	<p>Gogra River No. 150 s. (Fyzabad) On right bank, 1.7 miles W. of Mantajpur, 0.4 of a mile N.E. of Saráia, and 0.6 of a mile E. of Rámsahai Upádhyaipurwa.</p> <p>λ 26 46 7.55 L 82 5 42.21</p>
<p>Gogra River No. 134 s. (Fyzabad) On right bank.</p> <p>λ 26 38 49.21 L 82 26 42.33</p>	<p>Gogra River No. 143 s. (Gonda) On left bank, 1.2 miles S.E. of Shahganj, and 0.5 of a mile S.W. Lanti.</p> <p>λ 26 49 40.83 L 82 16 30.56</p>	<p>Gogra River No. 151 s. (Gonda) On left bank, 2.8 miles E. of Baunda, 1.3 miles S.E. of Sakhipur, and 0.4 of a mile S.W. of Dharoram or Motipurwa.</p> <p>λ 26 48 34.66 L 82 4 15.78</p>
<p>Gogra River No. 135 s. (Basti) On left bank, 1.6 miles S.E. of Pahia, and 0.9 of a mile S.W. of Chapia.</p> <p>λ 26 41 36.74 L 82 26 31.84</p>	<p>Gogra River No. 143 s. (Gonda) On left bank, 1.2 miles S.E. of Shahganj, and 0.5 of a mile S.W. Lanti.</p> <p>λ 26 49 40.83 L 82 16 30.56</p>	<p>Gogra River No. 152 s. (Fyzabad) Also called Magarsi Village s.; on right bank, in the large village of Magarsi.</p> <p>λ 26 46 59.09 L 82 3 4.32</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Gogra River No. 153 s. (Gonda) On left bank, 2·9 miles S.E. of Dhanauli, 0·7 of a mile S. of Marhain, and 2·4 miles N. of Dhamawa Ghat.</p> <p>λ 26 48 56·27 L 82 1 22·78</p>	<p>Gogra River No. 162 s. (Bara Banki) On right bank, 0·5 of a mile N.W. of Shioparsād Tola, and 0·4 of a mile N. of Koilawar.</p> <p>λ 26 52 6·41 L 81 50 9·30</p>	<p>Haud s. (Jaunpur) Also called Haund; on W. bank of tank, about 1·4 miles N.W. of Jaunpur fort, and 1 mile S.E. of Tājpur village.</p> <p>λ 25 45 52·64 L 82 43 3·61 No. 278</p>
<p>Gogra River No. 154 s. (Fyzabad) On right bank, 0·5 of a mile N. of Dimkapur, and 0·6 of a mile N.E. of Sanau.</p> <p>λ 26 47 6·09 L 81 58 51·89</p>	<p>Gogra River No. 163 s. (Gonda) On left bank, 0·4 of a mile S.W. of Thākuraīpurwa, and 1·4 miles N.E. of Dhama Ghat at the junction of the Sarju and Gogra rivers.</p> <p>λ 26 53 42·88 L 81 49 43·42</p>	<p>Hetapati Temple, (Allahabad) Spire. Also called Saidaganj white temple.</p> <p>λ 25 29 31·0 L 81 58 21·2</p>
<p>Gogra River No. 155 s. (Gonda) On left bank, 0·1 of a mile E. of Gopālpur, 1·3 miles S.E. of Paras, and 1·1 miles N.W. of Mangha.</p> <p>λ 26 49 10·36 L 81 57 55·08</p>	<p>Gogra River No. 164 s. (Bara Banki) On right bank, 1·2 miles N.W. of Dhema, and 0·4 of a mile N.E. of Nausara.</p> <p>λ 26 53 10·50 L 81 48 19·18</p>	<p>Ibrāhimpur Idgāh, (Allahabad) Centre dome.</p> <p>λ 25 28 47·1 L 81 58 7·3 See Synoptical Vol. of the Karāra Meridional Series.</p>
<p>Gogra River No. 156 s. (Fyzabad) Also called Sehor Ghat s.; on right bank, 0·8 of a mile N.W. of Kanaphorpur, and 0·5 of a mile E. of Sehor.</p> <p>λ 26 48 10·47 L 81 56 24·16</p>	<p>Gogra River No. 165 s. (Gonda) On left bank, 0·6 of a mile N.W. of Sirsaipurwa, and 0·7 of a mile E. of the Sarju river.</p> <p>λ 26 54 59·14 L 81 48 17·16</p>	<p>Isāpur Temple, (Jaunpur) Spire.</p> <p>λ 25 45 48·1 L 82 44 14·5 No. 281</p>
<p>Gogra River No. 157 s. (Gonda) On left bank, 0·3 of a mile S. of Jagannāthpurwa, 0·5 of a mile W. of Sagam Tiwāripurwa, and 0·8 of a mile N. of Hathi Singhpurwa.</p> <p>λ 26 50 21·23 L 81 55 48·86</p>	<p>Guptar Ghat Temple. (Fyzabad)</p> <p>λ 26 48 0·0 L 82 9 37·2</p>	<p>Jagdīshpur s. (Jaunpur) Near old well on high ground W. of village of the same name, and about 0·8 of a mile W. of the Busalampur large village.</p> <p>λ 25 47 1·77 L 82 39 14·89 No. 268</p>
<p>Gogra River No. 158 s. (Bara Banki) On right bank, 2·2 miles N. of Hājīpur, and at the same distance W. of Raghupur.</p> <p>λ 26 49 21·92 L 81 53 59·07</p>	<p>Gurdari Hill Mark. (Baghelkhand, Rewah State) On a great peak 5 miles N.N.E. of Jiawan.</p> <p>λ 24 23 12·17 L 82 21 32·45 Nos. 64, 65</p>	<p>Jamaura, III. (Vide page 4—N.)</p> <p>λ 24 53 44·49 L 82 29 31·07 H 723 h 8 No. 3</p>
<p>Gogra River No. 159 s. (Gonda) On left bank, 0·6 of a mile E. of Aman Singh's paku fort, 0·8 of a mile S.E. of Dhamawa-purwa, and 0·6 of a mile N. of Aili.</p> <p>λ 26 52 9·12 L 81 53 43·21</p>	<p>Gurūnagar, XXX. (Vide page 8—N.)</p> <p>λ 27 17 36·88 L 82 11 11·50 H 366 h 24 No. 30</p>	<p>Jaunpur Church, (Jaunpur) N.W. spire.</p> <p>λ 25 43 48·5 L 82 44 7·2 No. 277</p>
<p>Gogra River No. 160 s. (Bara Banki) On right bank, 0·2 of a mile N.E. of Kaithi village, and 0·7 of a mile S.E. of Kaithi ferry-ghat.</p> <p>λ 26 51 7·41 L 81 51 30·32</p>	<p>Halīa Masjid, (Mirzapur) N. minaret.</p> <p>λ 24 49 34·9 L 82 21 58·0</p>	<p>Jaunpur Fort s. (Jaunpur) On summit of high building on S.W. bastion of the fort occupied by the establishment of the Opium Agent.</p> <p>λ 25 44 53·83 L 82 43 49·94 No. 269</p>
<p>Gogra River No. 161 s. (Gonda) On left bank, 0·3 of a mile S.W. of Paska-Tola.</p> <p>λ 26 53 2·01 L 81 51 52·20</p>	<p>Hanumana Rock s. (Baghelkhand, Rewah State) W. side of high road to Mau, and N.W. of village of the same name.</p> <p>λ 24 46 55·88 L 82 8 23·75 Nos. 129, 130</p>	<p>Jaunpur Jail, (Jaunpur) N.W. bastion of sandstone.</p> <p>λ 25 44 23·9 L 82 43 56·7 No. 276</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Jaunpur Masjid Dome, (Jaunpur) Kalas.</p> <p>λ 25 45 31.2 L 82 43 38.5 No. 270</p> <p>Jaunpur Masjid Spire. (Jaunpur) N. spire of gateway.</p> <p>λ 25 45 31.5 L 82 43 38.8 Nos. 271, 272</p> <p>Jhūsi s. (Allahabad) On left bank of the Ganges, about 1½ miles E. of Allahabad fort.</p> <p>λ 25 25 35.75 L 81 56 30.59 See Synoptical Volume of the Karāra Meridional Series.</p> <p>Jhūsi Temple, (Allahabad) Near ghat.</p> <p>λ 25 26 18.8 L 81 56 44.2 See Synoptical Volume of the Karāra Meridional Series.</p> <p>Jiawan Hill Mark. (Baghelkhand, Rewah State)</p> <p>λ 24 21 51.78 L 82 20 11.54 No. 61</p> <p>Jigni h.s. (Baghelkhand, Rewah State) On the Drummond-ganj range, about 1 mile N.E. of Ghogām, and 2 miles E.N.E. of Raghunāthgarh village.</p> <p>λ 24 39 37.83 L 82 10 11.00 No. 122</p> <p>Kālāpatrī Hill Mark. (Mirzapur) On eastern edge of the Katra range; pargana Kantit.</p> <p>λ 24 44 54.54 L 82 17 35.74 Nos. 114, 115</p> <p>Kalsara s. (Allahabad) On S. bund of tank, 0.3 of a mile S. of the village so called, and 1 mile S.W. of Lariari.</p> <p>λ 24 59 24.48 L 81 57 40.41</p>	<p>Kāmpur s. (Jaunpur) On N. bank of an old tank adjoining the village, about ½ of a mile N.W. of Loka Serāi, ¼ of a mile E. of village of the same name, and at the same distance S. of Pattirāo.</p> <p>λ 25 45 46.47 L 82 34 53.87 No. 266</p> <p>Kapar h.s. (Baghelkhand, Rewah State) About 1 mile E.S.E. of Rundu, 1½ miles E.N.E. of Gorākhāri, and 1 mile S. of Pokra.</p> <p>λ 24 21 21.37 L 82 7 25.90 No. 82</p> <p>Kapradi, XIX. (Vide page 6—N.)</p> <p>λ 26 21 46.53 L 82 18 38.02 H 353.59* h 25.5 No. 19</p> <p>Karaun Fort s. (Allahabad) On N.E. bastion of old fort, 1.8 miles N. of Patertal, 0.2 of a mile W. of Karaun thāna gate, and 2 miles S.E. of Simeria village.</p> <p>λ 24 59 35.32 L 82 6 27.51 Nos. 149, 150</p> <p>Karbara s. (Baghelkhand, Rewah State) On height S. of village and close to N. bank of the Son river.</p> <p>λ 24 30 28.30 L 82 6 10.58 Nos. 95, 96</p> <p>Kasda, II. (Vide page 4—N.)</p> <p>λ 24 34 17.87 L 82 38 58.99 H 1572 h 9 No. 2</p> <p>Kataia Hill Pagoda s. (Mirzapur) On hill, S. of the Grand Trunk Road from Mirzapur to Allahabad, and ½ a mile S.E. of Gaipura.</p> <p>λ 25 9 5.91 L 82 26 21.05 No. 185</p>	<p>Katra, IV. (Vide page 4—N.)</p> <p>λ 24 50 50.27 L 82 12 9.34 H 1350 h 15 No. 4</p> <p>Katra Dāk Bungalow s. (Mirzapur) On Sun-dial in the compound and 50 yards S.W. of the bungalow.</p> <p>λ 24 53 16.60 L 82 13 5.08 No. 145</p> <p>Katra Pass s. (Mirzapur) On head of the pass west of the road.</p> <p>λ 24 51 36.73 L 82 11 17.27 Nos. 142, 143</p> <p>Katra Patrol's Bungalow s. (Mirzapur) S.W. angle of the S.E. turret over staircase.</p> <p>λ 24 52 45.70 L 82 12 22.93 No. 144</p> <p>Kesra Hill Mark. (Baghelkhand, Rewah State) On the Kaimūr range.</p> <p>λ 24 30 19.04 L 81 50 50.00 Nos. 99, 100</p> <p>Ketulpur s. (Jaunpur) On mound in village, 0.4 of a mile W. of the large village of Saipur, and 0.7 of a mile S.E. of Jiripura.</p> <p>λ 25 46 10.14 L 82 29 39.84 No. 264</p> <p>Khairagarh Fort s. (Allahabad) On fort near old gateway, 0.7 of a mile N. of Barsaita village.</p> <p>λ 25 10 53.38 L 82 6 18.94</p> <p>Khāmāria Shiwāla, (Mirzapur) Spire.</p> <p>λ 25 14 26.8 L 82 33 6.3 No. 253</p>

* This height refers to the upper mark-stone of the tower and was determined as follows. The point leveled to was on a paka brick imbedded in earth on E. side of the tower of which the height = 341.17 feet, and to this was added 12.42 feet (the height of the upper mark-stone above this brick).

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Khámerji h.s. <i>(Baghelkhand, Rewah State)</i> On a remarkable commanding peak forming the southern boundary of the Kaimúr range above the Son river, about 1½ miles N.N.E. of village of the same name, 2½ miles E.S.E. of Malakpur, 2½ miles W.S.W. of Karwi Kar village, and 2½ miles N.W. of Koludi. <div style="text-align: center;">o ' "</div> <div style="display: flex; justify-content: space-between;"> <div> λ 24 31 26.59 L 81 57 33.28 No. 80 </div> <div> λ 26 51 41.75 L 82 24 54.56 H_s 305.12* h 27 No. 25 </div> <div> λ 24 37 49.90 L 81 58 15.95 No. 106 </div> </div>	Kumeria, XXV. <i>(Vide page 7—N.)</i> <div style="text-align: center;">o ' "</div> <div style="display: flex; justify-content: space-between;"> <div> λ 24 31 26.59 L 81 57 33.28 No. 80 </div> <div> λ 26 51 41.75 L 82 24 54.56 H_s 305.12* h 27 No. 25 </div> <div> λ 24 37 49.90 L 81 58 15.95 No. 106 </div> </div>	Machir h.s. <i>(Baghelkhand, Rewah State)</i> On the Drummond-gunj range, close to and E. of village of the same name, and 1½ miles N.W. of Rámpur. <div style="text-align: center;">o ' "</div> <div style="display: flex; justify-content: space-between;"> <div> λ 24 31 26.59 L 81 57 33.28 No. 80 </div> <div> λ 26 51 41.75 L 82 24 54.56 H_s 305.12* h 27 No. 25 </div> <div> λ 24 37 49.90 L 81 58 15.95 No. 106 </div> </div>
Kheri Bungalow. <i>(Allahabad)</i> Chimney of Patrol's bungalow. <div style="display: flex; justify-content: space-between;"> <div> λ 25 2 1.8 L 81 52 2.0 Nos. 126, 127 </div> <div> λ 24 21 54 L 82 15 30 No. 67 </div> <div> λ 25 41 9.79 L 82 27 15.81 No. 263 </div> </div>	Kumeria Peak. <i>(Baghelkhand, Rewah State)</i> 1 mile S.W. of the village so called. <div style="display: flex; justify-content: space-between;"> <div> λ 25 2 1.8 L 81 52 2.0 Nos. 126, 127 </div> <div> λ 24 21 54 L 82 15 30 No. 67 </div> <div> λ 25 41 9.79 L 82 27 15.81 No. 263 </div> </div>	Machlishahr s. <i>(Jaunpur)</i> On N.E. bastion of Tahsildári in centre of the city, close to and S.E. of Ghiswa town, and about 1 mile W. of Mirpur. <div style="display: flex; justify-content: space-between;"> <div> λ 25 2 1.8 L 81 52 2.0 Nos. 126, 127 </div> <div> λ 24 21 54 L 82 15 30 No. 67 </div> <div> λ 25 41 9.79 L 82 27 15.81 No. 263 </div> </div>
Kodaili Hill Mark. <i>(Baghelkhand, Rewah State)</i> On a detached height belonging to the Drummondganj range. <div style="display: flex; justify-content: space-between;"> <div> λ 24 42 36.31 L 82 7 51.99 Nos. 152, 153 </div> <div> λ 25 10 22.1 L 82 54 55.7 No. 51 </div> <div> λ 25 24 24 L 81 57 2 No. 263 </div> </div>	Kusáhi Temple. <i>(Mirzapur)</i> <div style="display: flex; justify-content: space-between;"> <div> λ 24 42 36.31 L 82 7 51.99 Nos. 152, 153 </div> <div> λ 25 10 22.1 L 82 54 55.7 No. 51 </div> <div> λ 25 24 24 L 81 57 2 No. 263 </div> </div>	Mahmudabad Munshi's Temple. <i>(Allahabad)</i> <div style="display: flex; justify-content: space-between;"> <div> λ 24 42 36.31 L 82 7 51.99 Nos. 152, 153 </div> <div> λ 25 10 22.1 L 82 54 55.7 No. 51 </div> <div> λ 25 24 24 L 81 57 2 No. 263 </div> </div>
Kohrár h.s. <i>(Allahabad)</i> On Bind range of hills S.W. of village of the same name. <div style="display: flex; justify-content: space-between;"> <div> λ 25 8 19.37 L 82 0 6.53 Nos. 152, 153 </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> <div> λ 24 53 40.79 L 82 1 33.67 Nos. 138, 139 </div> </div>	Kusalpurwa Mark. <i>(Allahabad)</i> On the tank bund of the village so called on the Bind hills, 6 miles W. of Tikor principal station, and 1½ miles N.E. of Unchadeh; thána Bháratganj, pargana Khairagarh. <div style="display: flex; justify-content: space-between;"> <div> λ 25 8 19.37 L 82 0 6.53 Nos. 152, 153 </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> <div> λ 24 53 40.79 L 82 1 33.67 Nos. 138, 139 </div> </div>	Majgaon Hill Mark. <i>(Allahabad)</i> On E. extremity of an isolated hill S.E. of Barokhar. <div style="display: flex; justify-content: space-between;"> <div> λ 25 8 19.37 L 82 0 6.53 Nos. 152, 153 </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> <div> λ 24 53 40.79 L 82 1 33.67 Nos. 138, 139 </div> </div>
Kohrár Temple. <i>(Allahabad)</i> Spire of white temple in city. <div style="display: flex; justify-content: space-between;"> <div> λ 25 8 19.37 L 82 0 6.53 Nos. 152, 153 </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> <div> λ 24 53 40.79 L 82 1 33.67 Nos. 138, 139 </div> </div>	Kuti Ghát Temple. <i>(Allahabad)</i> On left bank of the Ganges river. <div style="display: flex; justify-content: space-between;"> <div> λ 25 8 19.37 L 82 0 6.53 Nos. 152, 153 </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> <div> λ 24 53 40.79 L 82 1 33.67 Nos. 138, 139 </div> </div>	Mánapára, XXIX. <i>(Vide page 8—N.)</i> <div style="display: flex; justify-content: space-between;"> <div> λ 25 8 19.37 L 82 0 6.53 Nos. 152, 153 </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> <div> λ 24 53 40.79 L 82 1 33.67 Nos. 138, 139 </div> </div>
Kopa, XXVIII. <i>(Vide page 8—N.)</i> <div style="display: flex; justify-content: space-between;"> <div> λ 27 7 3.74 L 82 15 15.40 H 365 h 20 No. 28 </div> <div> λ 25 29 17.9 L 81 57 25.1 See Synoptical Volume of the Karára Meridional Series. Lálganj h.s. <i>(Mirzapur)</i> About 2½ miles E. of village of the same name, and ½ of a mile S. of the high road running S.W. from Mirzapur. <div style="display: flex; justify-content: space-between;"> <div> λ 25 29 17.9 L 81 57 25.1 See Synoptical Volume of the Karára Meridional Series. </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> <div> λ 24 53 40.79 L 82 1 33.67 Nos. 138, 139 </div> </div> </div> </div>	Kuti Ghát Temple. <i>(Allahabad)</i> On left bank of the Ganges river. <div style="display: flex; justify-content: space-between;"> <div> λ 25 8 19.37 L 82 0 6.53 Nos. 152, 153 </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> <div> λ 24 53 40.79 L 82 1 33.67 Nos. 138, 139 </div> </div>	Mao Temple. <i>(Fyzabad)</i> S. of Fyzabad. <div style="display: flex; justify-content: space-between;"> <div> λ 25 8 19.37 L 82 0 6.53 Nos. 152, 153 </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> <div> λ 24 53 40.79 L 82 1 33.67 Nos. 138, 139 </div> </div>
Korawa Rock. <i>(Baghelkhand, Rewah State)</i> Staff on precipitous rock S.E. of Bakshipahár. <div style="display: flex; justify-content: space-between;"> <div> λ 22 55 52.5 L 81 50 1.0 Nos. 244, 245 </div> <div> λ 25 29 17.9 L 81 57 25.1 See Synoptical Volume of the Karára Meridional Series. </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> </div>	Lálganj Pagoda. <i>(Mirzapur)</i> Spike or Kalas of dome of white pagoda. <div style="display: flex; justify-content: space-between;"> <div> λ 22 55 52.5 L 81 50 1.0 Nos. 244, 245 </div> <div> λ 25 29 17.9 L 81 57 25.1 See Synoptical Volume of the Karára Meridional Series. </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> </div>	Mara Dome. <i>(Allahabad)</i> Also called Manda Dome; dome of white temple in Rája's house. <div style="display: flex; justify-content: space-between;"> <div> λ 22 55 52.5 L 81 50 1.0 Nos. 244, 245 </div> <div> λ 25 29 17.9 L 81 57 25.1 See Synoptical Volume of the Karára Meridional Series. </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> </div>
Kukra Shiwála, <i>(Allahabad)</i> Spire. <div style="display: flex; justify-content: space-between;"> <div> λ 25 22 8.5 L 82 1 25.6 Nos. 244, 245 </div> <div> λ 25 29 17.9 L 81 57 25.1 See Synoptical Volume of the Karára Meridional Series. </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> </div>	Lowana Tree. <i>(Allahabad)</i> In Centre of village. <div style="display: flex; justify-content: space-between;"> <div> λ 25 22 8.5 L 82 1 25.6 Nos. 244, 245 </div> <div> λ 25 29 17.9 L 81 57 25.1 See Synoptical Volume of the Karára Meridional Series. </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> </div>	Mara Temple. <i>(Allahabad)</i> Also called Manda Temple; spire of sandstone temple. <div style="display: flex; justify-content: space-between;"> <div> λ 25 22 8.5 L 82 1 25.6 Nos. 244, 245 </div> <div> λ 25 29 17.9 L 81 57 25.1 See Synoptical Volume of the Karára Meridional Series. </div> <div> λ 25 2 53.58 L 82 16 24.06 No. 151 </div> </div>

* This height refers to the mark-stone let into the ground floor of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Mara West h.s. (Allahabad) Also called Manda h.s.; mark 80 yards E. of the hill temple.</p> <p>λ 25 6 20.77 L 82 18 54.11 No. 182</p> <p>Maránadi s. (Fyzabad) On right bank of the Sarju river, about $\frac{1}{2}$ of a mile N. of Bilári, and 1 mile N. of road from Tanda to Oudh.</p> <p>λ 26 41 34.60 L 82 20 10.57 Nos. 295, 296</p> <p>Marár, XI. (Vide page 5—N.)</p> <p>λ 25 41 17.20 L 82 16 46.18 H 371 h 22 No. 11</p> <p>Matura s. (Mirzapur) On lands 500 yards S.W. of the village, about 1 mile S.W. of Mánikpur, and $\frac{1}{2}$ of a mile N.W. of Dulehpur.</p> <p>λ 25 1 32.10 L 82 22 7.27 No. 171</p> <p>Matwár s. (Mirzapur) On S. bund of tank, about $\frac{1}{2}$ of a mile N.W. of village of that name, and $1\frac{1}{2}$ miles S.W. of Majhgawan.</p> <p>λ 24 43 10.56 L 82 29 58.05</p> <p>Mau Dák Bungalow, (Baghelkhand, Rewah State) Chimney.</p> <p>λ 24 39 52.5 L 81 55 20.0</p> <p>Mau Rock s. (Baghelkhand, Rewah State) On flat rocks S.W. of the Dák bungalow.</p> <p>λ 24 39 41.4 L 81 55 8.3 Nos. 108, 109</p> <p>Mau Temple. (Baghelkhand, Rewah State) Spire of white temple in the fort.</p> <p>λ 24 39 10.5 L 81 54 9.9 No. 107</p> <p>Mauganj Temple. (Baghelkhand, Rewah State) Spire of white temple in the bazar.</p> <p>λ 24 40 4.0 L 81 54 48.8</p>	<p>Meja, VI. (Vide page 4—N.)</p> <p>λ 25 7 10.16 L 82 9 20.56 H 498 h 8 No. 6</p> <p>Meja Fort. (Allahabad) Mark on S.E. side of the old fort.</p> <p>λ 25 8 36.0 L 82 9 3.9 No. 168</p> <p>Meja h.s. (Allahabad) About $\frac{1}{2}$ of a mile S. of Meja village, and 1 mile W. of the Tahsildári.</p> <p>λ 25 7 52.32 L 82 8 37.63 No. 166</p> <p>Meja Tahsildári, (Allahabad) N.E. turret.</p> <p>λ 25 8 32.0 L 82 8 40.3</p> <p>Meja Tahsildári, (Allahabad) S.E. turret.</p> <p>λ 25 8 31.1 L 82 8 40.1 No. 157</p> <p>Mirzapur Bungalow, (Mirzapur) Mr. Evans's.</p> <p>λ 25 9 39.7 L 82 36 59.5 Nos. 53, 54</p> <p>Mirzapur Cantonment, (Mirzapur) S.E. angle of terrace.</p> <p>λ 25 10 55.0 L 82 38 15.9 Nos. 55, 56</p> <p>Mirzapur Church, (Mirzapur) Steeple.</p> <p>λ 25 9 42.8 L 82 38 10.3 Nos. 186, 240</p> <p>Mirzapur Court House, (Mirzapur) New.</p> <p>λ 25 9 18.2 L 82 37 24.1 No. 52</p>	<p>Mirzapur Great Shiwála. (Mirzapur) On right bank of the Ganges to N.W. side of the city.</p> <p>λ 25 9 5.4 L 82 36 53.8 No. 259</p> <p>Mirzapur Large Shiwála. (Mirzapur) White Shiwála spire S. of the city.</p> <p>λ 25 8 51.4 L 82 35 33.6 No. 258</p> <p>Misrapur Shiwála, (Mirzapur) Spire.</p> <p>λ 25 15 53.7 L 82 19 19.3 No. 250</p> <p>Mohári h.s. (Mirzapur) About a mile S.E. of Mohári Khurd, $1\frac{1}{2}$ miles N. of Mohári Kalán, and $2\frac{1}{2}$ miles N.E. of Bijaipur.</p> <p>λ 25 7 52.08 L 82 28 19.34 Nos. 49, 50</p> <p>Moia N. Shiwála, (Mirzapur) Spire.</p> <p>λ 25 10 16.7 L 82 34 48.0 Nos. 254, 255</p> <p>Moia S. Shiwála, (Mirzapur) Spire.</p> <p>λ 25 10 5.4 L 82 34 31.0 No. 256</p> <p>Moia s. (Allahabad) Also called Allahabad No. 1 s.; 0.6 of a mile N.W. of village of the same name.</p> <p>λ 25 23 19.65 L 81 56 29.36 No. 258</p> <p>Morchía h.s. (Baghelkhand, Rewah State) Mark on hill 3 miles S.E. of Pokra village.</p> <p>λ 24 16 34.49 L 82 34 9.12 See Morchía of the Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Moti Taláo Temple. (Mirzapur)</p> <p>λ 25 9 22.7 L 82 30 16.7</p>

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Múgarikot s. (Mirzapur) On N.E. angle of an old fort W. of the village.</p> <p>λ 24 52 51.80 L 82 13 5.92 No. 135</p>	<p>Newa, XVI. (Vide page 6—N.)</p> <p>λ 26 5 35.33 L 82 9 39.52 H 355 h 26 No. 16</p>	<p>Oudh Temple No. 3. (Fyzabad)</p> <p>λ 26 48 33.6 L 82 14 43.4</p>
<p>Murchia, I. (Vide page 4—N.)</p> <p>λ 24 34 49.34 L 82 23 26.80 H 1640 h 9 No. 1</p>	<p>Newáda, XIII. (Vide page 5—N.)</p> <p>λ 25 50 18.51 L 82 17 42.99 H 332 h 24 No. 13</p>	<p>Oudh Temple s. (Fyzabad) On right bank, of the Gogra river, on platform of temple at Rájghat in the city of Oudh.</p> <p>λ 26 48 32.84 L 82 14 46.90</p>
<p>Murda Hill Temple, (Baghelkhand, Rewah State) N.E. of village.</p> <p>λ 24 28 45.8 L 82 5 43.0 No. 97</p>	<p>Orejhar, XXIV. (Vide page 7—N.)</p> <p>λ 26 46 55.54 L 82 14 34.78 H 392.16* h 8 No. 24</p>	<p>Pahári h.s. (Baghelkhand, Rewah State) On a detached hill S. of village of the same name, about ½ of a mile S.W. of Baihera, and 1½ miles E. of Dhumana.</p> <p>λ 24 31 36.71 L 82 5 2.14 Nos. 91, 92</p>
<p>Murli h.s. (Mirzapur) On a detached peak of the Kaimúr range, 4 miles S.W. of Halía.</p> <p>λ 24 47 26.81 L 82 18 37.55 Nos. 112, 113</p>	<p>Oudh Masjid No. 1, (Fyzabad) N. Minaret.</p> <p>λ 26 48 25.5 L 82 14 48.7</p>	<p>Paighambarpur Dargah, (Allahabad) Centre.</p> <p>λ 25 31 9.0 L 81 58 11.8</p>
<p>Nagrai Rock s. (Baghelkhand, Rewah State) On southern face of the Drummondganj range, about 1½ miles W. of Dammodagarh, and 1½ miles S.E. of Rámpur village.</p> <p>λ 24 36 25.02 L 82 0 22.76 No. 98</p>	<p>Oudh Masjid No. 1, (Fyzabad) S. minaret.</p> <p>λ 26 48 24.9 L 82 14 48.6</p>	<p>Pakera h.s. (Baghelkhand, Rewah State) On hill ½ of a mile N. of tank in village.</p> <p>λ 24 28 37.17 L 82 14 11.83 Nos. 78, 79</p>
<p>Nansa, XXI. (Vide page 7—N.)</p> <p>λ 26 31 45.70 L 82 19 52.27 H 344 h Not forthcoming No. 21</p>	<p>Oudh Masjid No. 2, (Fyzabad) N. minaret.</p> <p>λ 26 48 32.5 L 82 14 48.7</p>	<p>Panasa Tree. (Allahabad) On old fort.</p> <p>λ 25 16 21 L 82 5 26</p>
<p>Naun Hill Mark. (Baghelkhand, Rewah State) On N. face of the Drummondganj range.</p> <p>λ 24 46 20.39 L 82 13 17.23 No. 123</p>	<p>Oudh Masjid No. 2, (Fyzabad) S. minaret.</p> <p>λ 26 48 31.5 L 82 14 48.6</p>	<p>Pándipura h.s. (Mirzapur) About 1½ miles N.E. of Dube Patti, and ½ of a mile S.W. of Parsia village.</p> <p>λ 25 6 43.63 L 82 31 22.35 Nos. 46, 165, 166</p>
<p>Naun Temple, (Baghelkhand, Rewah State) Spire.</p> <p>λ 24 44 33.2 L 82 11 40.1 No. 128</p>	<p>Oudh Temple No. 1. (Fyzabad) Spire of great temple called Rámádhín's temple.</p> <p>λ 26 47 45.7 L 82 14 55.1 No. 285</p>	<p>Panjerio Hill Mark. (Baghelkhand, Rewah State)</p> <p>λ 24 29 10.09 L 82 44 18.73 Nos. 37, 38</p>
	<p>Oudh Temple No. 2. (Fyzabad) Spire of N. temple.</p> <p>λ 26 48 11.6 L 82 15 1.9 Nos. 293, 294</p>	<p>Parila Temple, (Allahabad) Spire.</p> <p>λ 25 32 47.2 L 81 56 15.1</p>
		<p>Parípura, XIV. (Vide page 6—N.)</p> <p>λ 25 54 33.57 L 82 9 4.94 H 332 h 20 No. 14</p>

* This height refers to the mark-stone let into the upper surface of the pillar. This height as determined by Revenue Survey Spirit Levelling Operations is 392.23 feet.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Parsádi Temple. (Allahabad) Spire of temple on high road.</p> <p>o ' "</p> <p>λ 25 34 57·1 L 82 10 10·3</p> <p>Parsía s. (Mirzapur) On N.E. angle of tank bund, about $\frac{1}{2}$ of a mile N.W. of Parsía Khurd, $1\frac{1}{2}$ miles W. of Jhagaha village, and $\frac{1}{2}$ of a mile S. of Murpeli.</p> <p>λ 24 36 57·42 L 82 24 34·24 No. 105</p> <p>Pátpára h.s. (Baghelkhand, Rewah State) On range $\frac{1}{2}$ of a mile S.E. of village of the same name, $1\frac{1}{2}$ miles N.E. of Kakraha, and $\frac{1}{2}$ a mile W. of Salia village.</p> <p>λ 24 28 44·80 L 81 56 12·54 Nos. 93, 94</p> <p>Paua h.s. (Mirzapur) Also called Manjarah h.s.; $\frac{1}{2}$ of a mile N.E. of Newrha Mánpurí, and $\frac{1}{2}$ of a mile S.W. of Hutwa Mánpurí.</p> <p>λ 25 5 35·34 L 82 41 57·78 Nos. 44, 45</p> <p>Phúlpur Temple. (Allahabad) Spire of temple in city.</p> <p>λ 25 32 57·2 L 82 8 8·6</p> <p>Pokra, XXXI.* (Vide page 4—N.)</p> <p>λ 24 18 47·97 L 82 31 5·68 H 2207 h 3 No. 1</p> <p>Pokra s. (Baghelkhand, Rewah State) Mark at the village.</p> <p>λ 24 18 19·48 L 82 31 38·26 See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Ráhet, XXII. (Vide page 7—N.)</p> <p>λ 26 37 1·92 L 82 10 53·86 H 343·80† h 25·5 No. 22</p>	<p>Rájapur h.s. (Mirzapur) About $1\frac{1}{2}$ miles N.E. of Dikhwah, and $1\frac{1}{2}$ miles S. of Umaría Sardar Gír.</p> <p>o ' "</p> <p>λ 24 56 35·92 L 82 45 44·34 Nos. 42, 43</p> <p>Rája Taláo Temple. (Mirzapur) Or Baggah Temple.</p> <p>λ 25 15 48·7 L 82 53 21·5 No. 59</p> <p>Rajauli Paka House s. (Fyzabad) On right bank of the Gogra river, on a paka house belonging to the late queen of Fyzabad near Guptar Ghat one of the remarkable places of pilgrimage.</p> <p>λ 26 48 11·27 L 82 10 7·76</p> <p>Rájarhar Temple. (Baghelkhand, Rewah State)</p> <p>λ 24 33 20·7 L 82 12 15·6</p> <p>Rámapura, XII. (Vide page 5—N.)</p> <p>λ 25 44 55·09 L 82 8 7·76 H 356 h 30 No. 12</p> <p>Rámnagar Temple. (Allahabad) Spire of very high temple near road to Allahabad.</p> <p>λ 25 15 2·5 L 82 9 26·2 No. 162</p> <p>Rámpur Shiwála. (Mirzapur) Spire of Shiwála on S. bank of the Ganges.</p> <p>λ 25 15 2·5 L 82 27 49·2 No. 251</p> <p>Rarauli, XX. (Vide page 6—N.)</p> <p>λ 26 26 54·27 L 82 10 43·82 H 357 h 32 No. 20</p> <p>Sabanjot, XXVII. (Vide page 7—N.)</p> <p>λ 27 2 53·90 L 82 25 39·64 H 333 h 32 No. 27</p>	<p>Sabkalai h.s. (Baghelkhand, Rewah State) On the Drummond-gunj range S.W. of Baisaur village.</p> <p>o ' "</p> <p>λ 24 48 18·27 L 82 5 20·49 No. 116</p> <p>Saibara, XLIII.† (Vide page 8—N.)</p> <p>λ 27 26 58·94 L 82 8 0·31 H 389·90§ h 24 No. 32</p> <p>Saifabad, XV. (Vide page 6—N.)</p> <p>λ 26 1 5·10 L 82 18 58·32 H 340 h 12 No. 15</p> <p>Sanderipahár Hill Mark. (Baghelkhand, Rewah State) On the peak of the range running N.E. from Gurdari Hill Mark.</p> <p>λ 24 24 36·12 L 82 27 20·22 No. 69</p> <p>Sansárpur Hill Mark. (Allahabad) On S. edge of the Kaimúr range.</p> <p>λ 24 52 26·98 L 82 7 50·88 No. 134</p> <p>Sarái Masjid, (Allahabad) S.W. minaret.</p> <p>λ 25 29 24·4 L 82 15 38·0 No. 261</p> <p>Saráia s. (Jaunpur) On S.W. bank of an old tank, about 0·2 of a mile S. of village of the same name, 1·7 miles N.E. of Kasni, and 0·9 of a mile N.W. of Marsil village.</p> <p>λ 25 41 57·47 L 82 32 55·02 No. 265</p> <p>Sarju River s. (Fyzabad) On right bank, about $\frac{1}{2}$ of a mile N. of Tekeah, and 1 mile E. of Ajudhya Deh.</p> <p>λ 26 44 38·54 L 82 16 35·30 Nos. 291, 292</p>

* Of the Calcutta Longitudinal Series of the S. E. Quadrilateral. † This height refers to the mark-stone let into the ground floor of the tower.
 ‡ Of the North-East Longitudinal Series. § This height refers to the mark-stone let at $1\frac{1}{2}$ inches below the upper surface of the pillar.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Sathar s. (Allahabad) On tree, about $\frac{1}{2}$ of a mile N.W. of Mamrāj Sarāi masjid, and 1 mile S.W. of Sarāi masjid.</p> <p>λ 25 28 53.01 L 82 14 59.33 No. 260</p>	<p>Siwāra h.s. (Mirzapur) On the hill 3 miles E. of Lālganj.</p> <p>λ 25 0 0.57 L 82 27 30.50 No. 164</p>	<p>Tendúa h.s. (Baghelkhand, Rewah State) About 2½ miles N.E. of Sirua, and the same distance S.W. of Nauriah village.</p> <p>λ 24 28 29.70 L 82 30 39.85 No. 38</p>
<p>Seona, IX. (Vide page 5—N.)</p> <p>λ 25 27 33.51 L 82 18 30.96 H 333 h 23 No. 9</p>	<p>Sohāgi Hill Mark. (Baghelkhand, Rewah State) W. of high road, about 1 mile W. of the village.</p> <p>λ 24 58 22.90 L 81 43 41.20</p>	<p>Tharwa Factory. (Allahabad) Also called Thorui factory; flag on top of Mr. Sander's house.</p> <p>λ 25 32 33 L 81 57 32</p>
<p>Shiopur House. (Mirzapur) Staircase of a high house.</p> <p>λ 25 9 56.7 L 82 31 51.5 No. 252</p>	<p>Sugrimgari Tomb s. (Fyzabad) On tomb S. of Oudh, about $\frac{1}{2}$ of a mile N.W. of Kasuna on the Grand Trunk Road from Oudh to Fyzabad.</p> <p>λ 26 47 35.22 L 82 14 8.97 No. 286</p>	<p>Tikeria, XXVI. (Vide page 7—N.)</p> <p>λ 26 57 26.86 L 82 16 27.96 H 348 h 26 No. 26</p>
<p>Shiopur Temple. (Mirzapur) Spire of Mahādeo's temple.</p> <p>λ 25 10 12.8 L 82 32 1.1</p>	<p>Tānda Masjid No. 1, (Fyzabad) S. minaret.</p> <p>λ 26 33 12.4 L 82 42 18.0</p>	<p>Tikor, V. (Vide page 4—N.)</p> <p>λ 25 3 53.27 L 82 21 58.17 H 542 h 16 No. 5</p>
<p>Sihāwal h.s. (Baghelkhand, Rewah State) On rocks W. of the village, about $\frac{1}{2}$ of a mile S. of the road along N. bank of the Son river, and 1 mile S. of Ladbād village.</p> <p>λ 24 33 37.27 L 82 16 28.31 Nos. 86, 87</p>	<p>Tānda Masjid No. 1, (Fyzabad) N. minaret.</p> <p>λ 26 33 12.7 L 82 42 18.0</p>	<p>Tikor Hill Mark. (Mirzapur) On the highest part and to N.E. side of the hill.</p> <p>λ 25 5 35.26 L 82 23 41.45 Nos. 178, 179</p>
<p>Sikandra Temple, (Allahabad) In city.</p> <p>λ 25 35 15.6 L 82 1 6.1</p>	<p>Tānda Masjid No. 2, (Fyzabad) S. minaret.</p> <p>λ 26 33 19.5 L 82 42 14.6</p>	<p>Tons and Belan Junction s. (Baghelkhand, Rewah State) At the junction, 0.2 of a mile S.W. of Garkata village.</p> <p>λ 25 1 57.51 L 81 47 56.14</p>
<p>Sirmaul s. (Allahabad) Also called Sirhaul s.; on S.E. bund of tank, 0.6 of a mile S. of village of the same name.</p> <p>λ 24 57 20.43 L 82 15 48.77</p>	<p>Taripater Rock s. (Baghelkhand, Rewah State) On southern face of the Drummondganj range, about 1½ miles S.E. of Baroha, and 1½ miles N.E. of Sardawan village.</p> <p>λ 24 36 43.72 L 82 5 55.66 Nos. 101, 102</p>	<p>Tulsipur Pagoda, (Mirzapur) Dome, N. of the great road.</p> <p>λ 25 2 22.2 L 82 27 24.4 No. 170</p>
<p>Sirwāra, XVIII. (Vide page 6—N.)</p> <p>λ 26 16 23.86 L 82 9 57.19 H 348 h 28 No. 18</p>	<p>Tatpahār Hill Mark. (Baghelkhand, Rewah State) On Tatpahār range, N. of Purira village.</p> <p>λ 24 25 9.27 L 82 9 16.61 No. 70</p>	<p>Urkutia Hill Mark. (Baghelkhand, Rewah State) On a great peak, 3 miles N.E. of Kumoria, and 3 miles N. of Jiawan.</p> <p>λ 24 22 11.89 L 82 19 20.69 Nos. 62, 63</p>
<p>Siwar s. (Baghelkhand, Rewah State) Mark 20 yards S.W. from the stump of a pipal tree.</p> <p>λ 24 17 52.42 L 82 20 54.30 No. 66</p>	<p>Tatpahār h.s. (Baghelkhand, Rewah State) On Tatpahār range, N.W. of Kochipur village.</p> <p>λ 24 24 17.25 L 82 7 11.10 No. 68</p>	<p>X s. (Jaunpur) In field, close to and W. of the Grand Trunk Road from Benares to Jaunpur, about $\frac{1}{2}$ of a mile N. of Hosainabad, and $\frac{1}{2}$ a mile N. of Jaunpur Cantonment Telegraph Post; thāna Haveli Jaunpur.</p> <p>λ 25 44 19.63 L 82 43 43.21 No. 275</p>

GURWANI MERIDIONAL SERIES.

SUPPLEMENTARY LIST OF
CO-ORDINATES AND DESCRIPTIONS OF STATIONS AND POINTS.

Since the printing of the Alphabetical List of all stations and points it has been decided to include a further portion of the Ganges River Triangulation in this Volume, the stations of which appear below. In addition to the usual information the year when the point was fixed is also given.

Name of station, district, description, co-ordinates, &c.	Name of station, district, description, co-ordinates, &c.	Name of station, district, description, co-ordinates, &c.
<p>Balipurwa Village. 1848. (<i>Mirzapur</i>).</p> <p style="text-align: center;">° ' "</p> <p>λ 25 11 36 L 82 36 36</p>	<p>Bedauli House, In village. 1848. (<i>Mirzapur</i>).</p> <p style="text-align: center;">° ' "</p> <p>λ 25 11 0 L 82 43 9</p>	<p>Bhogaon Temple. 1848. (<i>Mirzapur</i>).</p> <p style="text-align: center;">° ' "</p> <p>λ 25 13 36.3 L 82 36 23.8</p>
<p>Baria Temple, On ghât. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 10.9 L 82 36 54.0</p>	<p>Behari House, In village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 15 L 82 38 34</p>	<p>Bisundarpur House, In village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 29 L 82 38 28</p>
<p>Basahi House. Two storied house in village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 6.0 L 82 34 56.5</p>	<p>Bhatauli Hut, On ghât. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 2 L 82 42 55</p>	<p>Chapaur House, In village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 32 L 82 41 52</p>
<p>Batauwa Bungalow. Top of factory bungalow. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 8 36.1 L 82 51 15.7</p>	<p>Bhiti Temple. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 14 2.7 L 82 38 46.7</p>	<p>Chîla Shiwâla, Flag. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 32.4 L 82 36 4.1</p>

Name of station, district, description, co-ordinates, &c.	Name of station, district, description, co-ordinates, &c.	Name of station, district, description, co-ordinates, &c.
<p>Chunar Fort, Flagstaff. 1848. (<i>Mirzapur</i>).</p> <p style="text-align: center;">° ' "</p> <p>λ 25 7 30.0 L 82 55 1.6</p> <p>See Synoptical Vol. of the Gora Meridional Series.</p>	<p>Ganges River No. 56 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p style="text-align: center;">° ' "</p> <p>λ 25 9 48.18 L 82 37 31.88</p>	<p>Ganges River No. 66 s. On left bank, 1.5 miles S.E. of Sasepura village house, and 100 yards W.S.W. of Bhogaon village house. 1848. (<i>Mirzapur</i>).</p> <p style="text-align: center;">° ' "</p> <p>λ 25 13 36.48 L 82 36 34.00</p>
<p>Chunar Fort, Sentry box in S.W. angle. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 11.2 L 82 55 7.9</p>	<p>Ganges River No. 57 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 56.94 L 82 38 13.50</p>	<p>Ganges River No. 67 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 51.70 L 82 37 22.26</p>
<p>Fulaha Temple. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 31.0 L 82 49 10.8</p>	<p>Ganges River No. 58 s. On left bank and about 0.1 of a mile from it. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 30.54 L 82 38 7.64</p>	<p>Ganges River No. 68 s. Also called Pachaura Village s., on left bank, 0.3 of a mile W.S.W. of Pachaura temple, and 100 feet E.S.E. of Pachaura village house. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 44.58 L 82 37 27.10</p>
<p>Gagraon Temple, In village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 14 2.7 L 82 38 46.3</p>	<p>Ganges River No. 59 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 32.53 L 82 38 24.52</p>	<p>Ganges River No. 69 s. On right bank, 0.2 of a mile N.W. of Nauria village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 19.96 L 82 37 47.11</p>
<p>Ganges River No. 50 s. On left bank, 0.5 of a mile W. of Moia building. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 59.68 L 82 34 3.74</p>	<p>Ganges River No. 60 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 2.10 L 82 38 6.33</p>	<p>Ganges River No. 70 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 55.85 L 82 38 20.61</p>
<p>Ganges River No. 51 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 6.86 L 82 35 1.43</p>	<p>Ganges River No. 61 s. On left bank, 0.3 of a mile E. of Bara Kolua, and 0.5 of a mile E.S.E. of Chhota Kolua village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 52.86 L 82 37 51.14</p>	<p>Ganges River No. 71 s. On right bank, 0.1 of a mile N.N.E. of Behari village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 21.45 L 82 38 37.50</p>
<p>Ganges River No. 52 s. On left bank, 0.2 of a mile S.S.W. of Purāna Bara. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 30.91 L 82 35 15.88</p>	<p>Ganges River No. 62 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 43.78 L 82 37 23.88</p>	<p>Ganges River No. 72 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 14 0.54 L 82 39 12.89</p>
<p>Ganges River No. 53 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 4.26 L 82 36 20.55</p>	<p>Ganges River No. 63 s. Also called Saunkapura Village s., on left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 24.53 L 82 36 52.86</p>	<p>Ganges River No. 73 s. On right bank, 0.5 of a mile N.N.W. of Khutaba village, and 0.6 of a mile N.N.E. of Nauhan. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 14.58 L 82 39 28.93</p>
<p>Ganges River No. 54 s. On left bank, 0.3 of a mile S.W. of Gargari house, and 0.1 of a mile S. of Shiodat Singh's temple. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 28.86 L 82 36 47.29</p>	<p>Ganges River No. 64 s. Also called Taksari Village s., on left bank, 50 yards N. of Taksari village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 10.97 L 82 36 2.15</p>	<p>Ganges River No. 74 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 53.48 L 82 41 2.42</p>
<p>Ganges River No. 55 s. Also called Mirzapur Court House s. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 18.28 L 82 37 23.79</p>	<p>Ganges River No. 65 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 19.72 L 82 37 6.14</p>	<p>Ganges River No. 75 s. On right bank, 0.1 of a mile N.N.W. of Sinhora village, and 0.6 of a mile W.N.W. of Mahādeva village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 49.60 L 82 40 30.11</p>

Name of station, district, description, co-ordinates, &c.	Name of station, district, description, co-ordinates, &c.	Name of station, district, description, co-ordinates, &c.
<p>Ganges River No. 76 s. On left bank, 0·2 of a mile W.N.W. of Khamária village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 34·44 L 82 41 53·27</p>	<p>Ganges River No. 86 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 22·81 L 82 44 56·85</p>	<p>Ganges River No. 96 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 8 1·69 L 82 49 23·42</p>
<p>Ganges River No. 77 s. On right bank, 0·1 of a mile N.N.E. of Majgawa village, the same distance E.N.E. of Leru village, and 0·2 of a mile W.N.W. of Chapaur village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 40·36 L 82 41 31·39</p>	<p>Ganges River No. 87 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 54·13 L 82 45 37·26</p>	<p>Ganges River No. 97 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 15·16 L 82 49 48·08</p>
<p>Ganges River No. 78 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 35·31 L 82 41 52·15</p>	<p>Ganges River No. 88 s. On right bank, 0·5 of a mile E. of Chatáha village, and 0·3 of a mile N.N.E. of Dharmdeva village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 4·41 L 82 45 8·01</p>	<p>Ganges River No. 98 s. On left bank, 0·6 of a mile S.E. of Rámgarh village house, and 0·3 of a mile S.S.W. of Galimai village house. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 27·03 L 82 50 9·21</p>
<p>Ganges River No. 79 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 59·67 L 82 43 4·08</p>	<p>Ganges River No. 89 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 34·04 L 82 46 35·57</p>	<p>Ganges River No. 99 s. On right bank, 0·1 of a mile N.N.E. of Suraiya village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 4·17 L 82 50 26·82</p>
<p>Ganges River No. 80 s. On right bank, 0·1 of a mile E.N.E. of Bhatauli village, and the same distance N.W. of Bhatauli bázár. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 5·75 L 82 42 49·18</p>	<p>Ganges River No. 90 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 18·19 L 82 45 52·04</p>	<p>Ganges River No. 100 s. On left bank, 0·5 of a mile S.W. of Gornia village house, and 0·6 of a mile W.S.W. of Sfikhar building. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 21·25 L 82 51 2·67</p>
<p>Ganges River No. 81 s. Also called Jaunsara Village s., on right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 54·08 L 82 43 7·15</p>	<p>Ganges River No. 91 s. On right bank, 0·1 of a mile N.N.W. of Nánupura village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 8 28·20 L 82 47 22·72</p>	<p>Ganges River No. 101 s. On right bank, 0·3 of a mile E. of Sindhaura village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 6 38·64 L 82 51 33·32</p>
<p>Ganges River No. 82 s. On left bank, 0·3 of a mile S.W. of Baraini village house, and 0·4 of a mile W.S.W. of Baraini temple. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 25·93 L 82 43 46·60</p>	<p>Ganges River No. 92 s. On left bank, 0·5 of a mile S.S.W. of Bidyapur village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 24·22 L 82 48 5·46</p>	<p>Ganges River No. 102 s. On left bank, 0·2 of a mile W.S.W. of Bithalpur village house. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 12·47 L 82 51 43·88</p>
<p>Ganges River No. 83 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 26·34 L 82 43 41·57</p>	<p>Ganges River No. 93 s. On left bank, 0·7 of a mile S.S.E. of Gosáinpur village, and 0·9 of a mile S. of Shiopura village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 26·02 L 82 48 44·44</p>	<p>Ganges River No. 103 s. On left bank, 0·2 of a mile W.S.W. of Silpi village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 1·64 L 82 52 31·28</p>
<p>Ganges River No. 84 s. On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 51·91 L 82 44 24·90</p>	<p>Ganges River No. 94 s. On left bank, 0·5 of a mile N.N.W. of Paimápur village house, and 0·3 of a mile N. of Kantápur village house. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 8 38·12 L 82 48 52·53</p>	<p>Ganges River No. 104 s. On right bank, 0·1 of a mile N.E. of Dhaurára village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 6 24·09 L 82 52 43·44</p>
<p>Ganges River No. 85 s. On right bank, 0·3 of a mile E.S.E. of Gautampatti village, and 0·2 of a mile N. of Rattambo village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 52·76 L 82 44 19·63</p>	<p>Ganges River No. 95 s. On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 59·13 L 82 48 8·63</p>	<p>Ganges River No. 105* s. On left bank, 0·8 of a mile S.W. of Madhi village building. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 5·19 L 82 53 2·47</p>

* The continuation of the Ganges River Triangulation to the east will be found in the Co-ordinate List of the Gora Meridional Series, where the stations are numbered afresh and not in continuation of those here given.

Name of station, district, description, co-ordinates, &c.	Name of station, district, description, co-ordinates, &c.	Name of station, district, description, co-ordinates, &c.
Gosáinpura Mat. 1848. (<i>Mirzapur</i>). o ' " λ 25 12 28·7 L 82 35 49·3	Mirzapur House No. 2. Parthráam Mahant's house. 1848. (<i>Mirzapur</i>). o ' " λ 25 8 41·6 L 82 35 49·8	Narghát Masjid, E. minaret. 1848. (<i>Mirzapur</i>). o ' " λ 25 8 57·1 L 82 36 8·3
Gosáinpura Temple. 1848. (<i>Mirzapur</i>). λ 25 9 31·1 L 82 49 10·7	Mirzapur House No. 3. Hamilton & Co's house chimney. 1848. (<i>Mirzapur</i>). λ 25 9 7·9 L 82 36 45·7	Narghát Masjid, W. minaret. 1848. (<i>Mirzapur</i>). λ 25 8 57·1 L 82 36 7·7
Itáwa Village. 1848. (<i>Mirzapur</i>). λ 25 14 10 L 82 39 53	Mirzapur House No. 4. Mr. Money's house chimney. 1848. (<i>Mirzapur</i>). λ 25 9 44·1 L 82 38 1·8	Pachaura Temple. 1848. (<i>Mirzapur</i>). λ 25 13 47·9 L 82 37 41·3
Jaunsara Mat. 1848. (<i>Mirzapur</i>). λ 25 11 46·0 L 82 43 10·7	Mirzapur House No. 5. Tiled house chimney. 1848. (<i>Mirzapur</i>). λ 25 10 8·7 L 82 38 20·3	Pipardar House, In village. 1848. (<i>Mirzapur</i>). λ 25 11 24 L 82 37 49
Kachahwa Mound. 1848. (<i>Mirzapur</i>). λ 25 12 6·9 L 82 45 14·8	Mirzapur, Mission Church, Turret. 1848. (<i>Mirzapur</i>). λ 25 9 11·7 L 82 37 17·8	Rámgarh Temple. 1848. (<i>Mirzapur</i>). λ 25 7 56·0 L 82 49 36·4
Keotábir Village. 1848. (<i>Mirzapur</i>). λ 25 13 25 L 82 42 27	Mirzapur s. Vide Ganges River No. 55 s.	Sabesar House, In village. 1848. (<i>Mirzapur</i>). λ 25 13 10 L 82 49 12
Khamária Village. 1848. (<i>Mirzapur</i>). λ 25 13 31 L 82 42 6	Munjhara Dharmśála. 1848. (<i>Mirzapur</i>). λ 25 12 28·8 L 82 35 49·1	Semra House, In village. 1848. (<i>Mirzapur</i>). λ 25 12 1 L 82 37 16
Leru Temple. 1848. (<i>Mirzapur</i>). λ 25 12 38·8 L 82 40 56·7	Munjhara House, In Bara Munjhara village. 1848. (<i>Mirzapur</i>). λ 25 12 50 L 82 35 36	Shamaspur Temple. White temple. 1848. (<i>Mirzapur</i>). λ 25 6 29·9 L 82 53 23·9
Mirzapur, Garden Gate. Lála Manbor's garden gate. 1848. (<i>Mirzapur</i>). λ 25 8 52·0 L 82 35 2·2	Murli h.s. On a hill about 2 miles S. of the Ganges. 1848. (<i>Mirzapur</i>). λ 25 5 21·45 L 82 51 22·55 See Synoptical Vol. of the Gora Meridional Series.	Sinhora Temple. 1848. (<i>Mirzapur</i>). λ 25 12 38·8 L 82 40 56·6
Mirzapur Hotel, Staircase. 1848. (<i>Mirzapur</i>). λ 25 9 31·4 L 82 37 47·4	Nánupura House, In village. 1848. (<i>Mirzapur</i>). λ 25 8 24 L 82 47 26	Tree on long hill. 1848. (<i>Mirzapur</i>). λ 25 5 39 L 82 41 54

GORA MERIDIONAL SERIES.

GORA MERIDIONAL SERIES—(LONG. $83^{\circ} 17'$).

INTRODUCTION.

The completion of the Northern Section of the Great Arc Series in the year 1842, left sufficient hands available for taking up, besides those in progress, two more of the meridional series, which had been designed by the Surveyor General in 1831 and approved by the Hon'ble Court of Directors, to span the great plain of the River Ganges and its affluents, in Bengal and the North-West Provinces.

These series, or chains of triangles, were to be carried successively at intervals of one degree (about 60 miles) of longitude apart, from the Great Arc Series in the centre of the Peninsula, eastwards.

The first four chains, the Budhon (1), Rangír (2), Amua (3), and Karára (4), were now in progress or finished, and the 5th and 6th, the Gurwáni and Gora, Series being the next in order to the eastward of the Karára, were in contemplation. But the Governor General in Council here interposed, and directed that the two new parties formed from the *personnel* of the Great Arc Establishment, should be employed, not on the 5th and 6th (Gurwáni and Gora) Series, but upon the Gora (6th) and the Ohendwár (8th), *i.e.* on the alternate series, at two degrees apart from one another, the Gurwáni (5th) and Huriláong (7th) being omitted for the time.

The Gora Series, so named from the station of that name, to the meridian of which ($83^{\circ} 17'$) it closely adheres, was based on the side Gora-Sewádhi of the Calcutta Longitudinal Series, whence it was carried for a distance of 210 miles to the northward, traversing the districts of Mirzapur (east side), Shahabad (west border), Benares, Ghazipur (west), Azamgarh, Gorakhpur (west side), and the eastern border of Basti, fixing the important towns of Chunar, Benares, Ghazipur, Azamgarh, and Gorakhpur.

It consists of twenty-nine stations, of which the six southernmost are on the Kaimúr range and other hills between the rivers Son (Soane) and Ganges, whilst the remaining twenty-three are tower stations of an average height of about 26 feet, in the plains.

The Series begins with two large single triangles stretching from the origin to the Kaimúr range, a distance of 41 miles, followed by six stations forming a compound figure round Basoha H.S., extending the Series a distance of 46 miles to the neighbourhood of Benares. The remainder of the Series consists of a chain of twenty-one single symmetrical triangles, having sides of about 12 miles in length.

During the recess season of 1843 the Surveyor General (Colonel G. Everest) directed

Season 1843-44.

PERSONNEL.

Mr. W. N. James, 1st Principal Sub-Assistant.
 „ H. Keelan, „
 (joined late in the season).
 „ T. Olliver, „
 „ W. R. James, „

Mr. W. N. James to organize a triangulating party of the usual strength, with the assistants marginally noted, and furnished with Harris and Barrow's 15-inch theodolite* which had been reconstructed in the departmental workshop. The party left the Head Quarters at Dehra Dún on the 1st of October 1843 and, after a long march of more than 500 miles, reached the scene of operations in January

1844, preceded by an advanced party which commenced the approximate series about the middle of December.

The progress of the work was much delayed owing to the haziness of the atmosphere, aggravated by the prevalence of forest fires in the neighbourhood of the operations. The approximate series however, was carried across the hill country a distance of 60 miles, and principal observations made at four stations, besides the determination of an astronomical azimuth, and a considerable quantity of secondary triangulation.

Mr. James went into recess quarters at Chunar on the 10th of May, but intended to resume the final observing as soon as the atmosphere should become clear. The party however suffered a good deal from sickness, five cases of cholera and two of sun-stroke proving fatal. Mr. James himself was taken ill in May, and died, unexpectedly, on the 14th June.

Lieutenant Peter Garforth of the Bengal Engineers, who had recently been appointed to the G. T. Survey Department and attached to the Chendwár Series, was forthwith ordered to take charge of the Gora Series, and reached Chunar on the 18th July 1844. His attention was first directed to a scrutiny of Mr. James's principal observations, and upon his report the Surveyor General directed them to be set aside, and the work to be recommenced from the origin. Accordingly Lieutenant Garforth took the field on the 1st October 1844 and proceeded to revise the work.

A good start seems to have been made at the outset, for on the 1st November he

Season 1844-45.

PERSONNEL.

Lieut. P. Garforth, Bengal Engineers, 2nd Asst.
 Mr. H. Keelan, Sub-Assistant.
 „ T. Olliver, „
 „ W. R. James, „

reported considerable progress in the approximate series, but afterwards the party was much hindered by sickness, and in the following months, November and December, was so crippled that no further progress was made, and the best part of the season for observing passed away fruitlessly.

During January 1845 the work was resumed, but slowly, and the rest of the field season was spent in ray-tracing, line-clearing, and building the towers at the selected stations.

In June the Series had been laid out as far as Barhanpur (x)† on the north bank of the Ganges, a distance of about 100 miles from origin, and the party then went into recess quarters at Allahabad where Lieutenant Garforth had the benefit of the Surveyor General's personal instructions and counsel, whilst the recruiting and training the party went on at his head quarters.

* For description of this instrument see page 72 of Appendices to Vol. II of the *Account of the Operations*, &c.

† The Roman number after the name of a station indicates its position in the series in numerical order.

The party took the field again early in October, reinforced by Mr. J. W. Armstrong who had already on several occasions had independent charge of a party, and reached the scene of the work before the end of the month. In accordance with his instructions Lieutenant Garforth employed the first part of the season in pushing on the approximate series in advance, so as to avoid entering the unhealthy tract of

Season 1845-46.

PERSONNEL.

Lieut. P. Garforth, B. E., 2nd Assistant.
Mr. J. W. Armstrong, 2nd Principal Sub-Asst.
" T. Olliver, "
" C. A. Olliver, "

hilly country to the south, in which, by neglecting this precaution, his whole party had been disabled by sickness and all progress stayed, the previous year. About the middle of November, having selected the stations as far as Chit Bistrám (xiv), 130 miles from origin, he returned southwards selecting *en route* the stations of Khám (v) and Kandákot (ii) on the Bindháchal and Kaimúr hill ranges, by which Mr. James's original plan of the Series was much improved, and extended by the formation of the polygonal figure round Basoha (iii).

The final observation of the horizontal and vertical angles was begun on the 12th of December at Gora H.S., where a set of star observations for azimuth to δ Ursæ Minoris, at both (E. and W.) elongations, was also taken in supersession of that observed by Mr. Olliver here in the course of the Calcutta Longitudinal Series, and the work was carried on and completed at the undermentioned stations, as follows:—

at Gora	H.S. (xxxv*)	between	December 12th	and	December 28th,	1845
„ Sewádhi	„ (xxxviii*)	„	January 3rd	„	January 8th,	1846
„ Bagdharua	„ (i)	„	„ 14th	„	„ 26th	„
„ Khám	„ (v)	„	„ 29th	„	„ 30th	„
„ Kandákot	„ (ii)	„	February 3rd	„	February 6th	„
„ Khorádi	„ (iv)	„	„ 9th	„	„ 13th	„
„ Basoha	„ (iii)	„	„ 18th	„	„ 25th	„
„ Garda	„ (vi)	„	March 2nd	„	March 5th	„
„ Sikri	T.S. (vii)	„	„ 9th	„	„ 21st	„
„ Hirdepur	„ (ix)	„	„ 31st	„	April 23rd	„
„ Barháni	„ (viii)	„	April 24th	„	June 4th,	several visits.
„ Barhanpur	„ (x)	„	June 7th	„	„ 10th	„
„ Gaura	„ (xi)	„	„ 11th	„	„ 14th	„
„ Kanaun	„ (xii)	„	„ 16th	„	July 5th	„
„ Kharakpur	„ (xiii)	„	July 6th	„	„ 15th	„
„ Chit Bistrám	„ (xiv)	„	„ 16th	„	„ 24th	„
„ Samenda	„ (xv)	„	„ 25th	„	August 8th	„

Luminous signals were observed throughout; heliotropes by day, and argand lamps by night.

At Hirdepur, α Ursæ Minoris was observed for azimuth at both elongations between March 30th and April 16th.

Latterly the work was very much retarded by thick hazy weather, especially at Barhá-

* Of the Calcutta Longitudinal Series.

ni, where two of the rays were from 25 to 30 miles in length, too long to be ordinarily practicable, except in very clear weather.

The principal observations at the last eight stations had occupied over four months, only one being done in April, and none in May. Lieutenant Garforth however felt obliged to remain in the field and accomplish the task set before him, in order to make up for the want of progress during the previous season. He only reached head quarters, Allahabad, on the 25th of August.

The party suffered a good deal by continuing the field work in the rainy season, and Mr. Armstrong was obliged to quit the field about the end of June. But for its inordinate length, the season's work would have been an unusually good one, comprising final observations at 17 principal stations, extending the Series over 130 miles from south to north, and including two sets of circumpolar star observations for azimuth, with a good proportion of secondary triangulation, chiefly on the Ganges, between Chunar, Sultānpur, Benares, and Ghazipur.

The approximate series, including the tracing and clearing of rays, and the selection and building of stations, was carried about 60 miles through the plain country, in the Ghazipur and Azamgarh districts, as far north as the river Gogra, three triangles in advance of the closing point of the final observations.

The Surveyor General visited and inspected the party at Basoha H.S., near Benares, in the latter part of February, when he found it necessary to clean the axis of the large theodolite, on account of its excessive and increasing stiffness, by which the horizontal angles must ere long have been deteriorated, although no ill effects were noticed in the measurements already made.

The party took the field again, as marginally noted, on the 9th of October, and reached

Season 1846-47.

PERSONNEL.

Lieutenant P. Garforth, B.E., 2nd Assistant.
Mr. J. W. Armstrong, 2nd Principal Sub-Assist.
„ G. E. Terry, 1st Class Sub-Assistant.
„ O. A. Olliver, 2nd Class „

the terminal point of the previous season's work on the 20th. Lieutenant Garforth at once took in hand the preliminary selection of stations in advance, whilst his assistants followed him, completing the requisite ray-clearing and tower-building, and by the beginning of December he

had reached the northern limit of the Series, after which he returned southwards to Samenda (xv), where he observed a set of circumpolar star observations to δ Ursæ Minoris at both (E. and W.) elongations, at the periodic time for that star, between the 19th and 28th of December. This done, he hurried back to the north end of the Series, where he designed a polygonal figure round Púrena T.S. (Lv of the North-East Longitudinal Series), which however he was not called upon to complete.

By the middle of February the approximate series was so far advanced as to be ready for the final measurements to be taken up where they had been left off the previous season.

Lieutenant Garforth therefore again repaired to the spot, and resumed the final observations which he completed at the undermentioned stations, as follows:—

at Samenda	T.S. (xv)	between February 15th and February 18th, 1847			
„ Bhadir	„ (xvi)	„ „ 18th „ „ 21st „			
„ Balariáganj	„ (xvii)	„ „ 21st „ „ 24th „			

at Baniápár	T.S. (xviii)	between February 24th and March 2nd, 1847
„ Rájgarh	„ (xx)	„ March 5th „ „ 13th „
„ Barhiáchak	„ (xix)	„ „ 13th „ „ 14th „
„ Bhisia	„ (xxi)	„ „ 14th „ „ 18th „
„ Katwar	„ (xxii)	„ „ 18th „ „ 22nd „
„ Deokali	„ (xxiii)	„ „ 22nd „ „ 26th „
„ Saraia	„ (xxiv)	„ „ 26th „ „ 27th „
„ Muhammadpur	„ (xxv)	„ „ 30th „ April 2nd „
„ Rájabári	„ (xxvi)	„ April 2nd „ „ 18th „
„ Gharbaria	„ (lviii)*	„ „ 18th „ „ 20th „
„ Nandaur	„ (xxvii)	„ „ 20th „ „ 22nd „
„ Dharamsingua	„ (lvi)*	„ „ 22nd „ „ 23rd „

A final set of circumpolar star observations for azimuth was taken at Rájabári, between the 6th and 18th of April to α Ursæ Minoris, at both (E. and W.) elongations.

The triangles that had been laid out to the north of Gharbaria-Dharamsingua were not observed this season, and as they appertain to the North-East Longitudinal Series, no account of them will be found in the published results of this Series. It may be remarked that Lieutenant Garforth's rate of progress in carrying on the final observations had increased greatly, for in the last seven weeks he completed eleven stations, including the eleven days spent in the azimuth observations at Rájabári. The out-turn of principal work for this season comprised: thirteen new stations selected, and the rays between them traversed, and cleared; twelve new towers built, over 25 feet in height (one of which Barhiáchak (xix) fell down twice, after completion to a height of 28 feet); fourteen triangles finally observed, extending the Series in a single chain 77 miles, in which two sets of star observations for azimuth were taken, besides a considerable amount of secondary triangulation which will be noticed separately below.

The entire period occupied by the Gora Series was four seasons, one of which, the first, may be said to have been lost, inasmuch as Mr. James's work had to be re-done, whence arose the necessity for re-visiting the unhealthy tract of country in which the party was disabled by sickness for a great part of the second season. On the whole, the entire Series, 210 miles in length, may be considered a very fair amount for three seasons, at the rate of about 70 miles per season, two of them being in a plain country.

On the completion of the Simultaneous Reduction of the North-East Quadrilateral, it was found that the undermentioned errors had been actually dispersed over the Gora Series between its origin, Gora-Sewádhi, of the Calcutta Longitudinal Series, and its terminus, Dharamsingua-Gharbaria, of the North-East Longitudinal Series:—

In Logarithm of the latter side—0.000, 0020, 1 or about 0.3 inches per mile.		
„ Azimuth	„	+0".628
„ Latitude of Gharbaria	„	+0.044
„ Longitude	„	+0.021

* Of the North-East Longitudinal Series.

Trigonometrical Heights.

The trigonometrical determinations of the height of the stations of this Series above mean sea level, were derived in the first place from those of Gora-Sewádhi, as trigonometrically determined between Sironj and Calcutta by the Calcutta Longitudinal Series adjusted to the spirit-leveled values of its origin and terminus. The height of thirteen of the stations, however, was subsequently determined by connection with the lines of spirit-levels executed of late years by the Survey Department, and corrections have been applied to the trigonometrical values to make them correspond with the former.

The actual corrections applied to the trigonometrical heights of the twenty-nine stations of this Series, as brought up from origin to terminus, a distance of 210 miles, average 4·7 feet per station; the largest cumulative error disclosed being at Katwar (xxii) 8·3 feet. The largest error detected on any one side is 3·7 feet, which occurs on the side Barháni-Hirdepur (viii-ix). For further information regarding the details of the dispersion of this error see page 40 of Part I of Volume VII of the *Account of the Operations &c.*

Secondary Triangulation.

The secondary triangulation in connection with the Gora Series may be divided into six parts:—

1st. The hill triangles. Many conspicuous objects and points, chiefly in the hilly country at the south end of the Series, were fixed by the 15-inch theodolite, occasionally supplemented by observations with the 7-inch theodolite; amongst these were several points in and about Chunar and Benares, and the famous hill fort of Bijaigarh.

2nd. A minor series was carried along the Ganges by Mr. Armstrong with a 7-inch theodolite between Chunar and Benares, a direct distance of about 20 miles, starting from two points near the former, fixed by the triangulation above mentioned, and checked near its close, by another point determined in the same way. Several points in the old cantonment of Sultánpur were fixed by this work.

3rd. A ray-trace triangulation was carried by Mr. Armstrong in April 1846 with a 12-inch theodolite to fix Ghazipur and its environs, starting from Kanaun (xii), and closing on Barhanpur (x) of the Gora Series with the final values of which it is made to accord as usual.

4th. The position of two permanent points at Azamgarh was determined by some triangulation dependent on the ray-trace triangles between Samenda (xv) and Balariáganj (xvii). This work was done by Mr. Armstrong in 1846-47 with a 7-inch theodolite.

5th. The position of several points in Gorakhpur was fixed in the same manner by some minor triangulation dependent on, and in extension of, the ray-trace triangulation from Muhammadpur (xxv) to Saraia (xxiv).

INTRODUCTION.

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6th. In season 1852-53 a chain of secondary triangles was carried up the river Gogra, crossing the Gora Series from east to west between the stations of Baniápár (xviii), and Barhiáchak (xix), with which it is connected. The details of this minor series between stations Nos. 59 and 114 are published as a portion of the Gora Series; the eastern portion is fitted in between Khádípur T.S. of the Huriláong Series and Baniápár of this Series; the western portion, between Barhiáchak and Bisaul of the Gurwáni Series.

In parts 2nd, 3rd, 4th, 5th, and 6th, where the intermediate stations of observation were not permanently marked, no details of the triangles are now published.

In all, the position-values of 315 secondary points are published, but many of the stations or points of observation, could not probably be now found and identified. Temples, landmarks, forts, and other buildings of a permanent kind, were fixed to the number of 180.

B. R. BRANFILL.

August 1881.

GORA MERIDIONAL SERIES.

ALPHABETICAL LIST OF STATIONS.

Bagdharua	I.	Hirdepúr	IX.
Balaríáganj	XVII.	Katwar	XXII.
Baniápár	XVIII.	Kanáon	XII.
Barháni	VIII.	Kandákot	II.
Barhápúr	X.	Khám	V.
Barhiáchak	XIX.	Kharakpúr	XIII.
Basoha	III.	Khorádi	IV.
Bhádir	XVI.	Máhamadpúr	XXV.
Bhisía	XXI.	Nandáor	XXVII.
Chit Bistrám	XIV.	Rájábári	XXVI.
Deokali	XXIII.	Rájarh	XX.
Dharamsingua (of North-East Longitudinal Series).	LVI.	Samenda	XV.
Gaora	XI.	Saraia	XXIV.
Garda	VI.	Sewádhi (of Calcutta Longitudinal Series).	XXXVIII.
Gharbaria (of North-East Longitudinal Series).	LVIII.	Sikri	VII.
Gora (of Calcutta Longitudinal Series).	XXXV.		

GORA MERIDIONAL SERIES.

NUMERICAL LIST OF STATIONS.



XXXV	Gora. (of Calcutta Longitudinal Series).	XV	Samenda.
XXXVIII	Sewádhi. (of Calcutta Longitudinal Series).	XVI	Bhádir.
I	Bagdharua.	XVII	Balaríáganj.
II	Kandákot.	XVIII	Baníápár.
III	Basoha.	XIX	Barhíáchak.
IV	Khorádi.	XX	Rájgarh.
V	Khám.	XXI	Bhisía.
VI	Garda.	XXII	Katwar.
VII	Sikri.	XXIII	Deokali.
VIII	Barháni.	XXIV	Saraia.
IX	Hirdepúr.	XXV	Máhamadpúr.
X	Barhánpúr.	XXVI	Rájábári.
XI	Gaora.	XXVII	Nandáor.
XII	Kanáon.	LVI	Dharamsingua. (of North-East Longitudinal Series).
XIII	Kharakpúr.	LVIII	Gharbaria. (of North-East Longitudinal Series).
XIV	Chit Bisráam.		

GORA MERIDIONAL SERIES.

DESCRIPTION OF STATIONS.



XXXV. (*Of Calcutta Longitudinal Series*). Gora Hill Station, lat. $24^{\circ} 5'$, long. $83^{\circ} 17'$, has been named after the village of Gora which lies about 1 mile to the S.E., pargana Singraoli of the Mirzapore district. The hill is called Chandol by the villagers; another hill called Mirgárání, connected with it by a low ridge, is about 1 mile to E., and the detached hill of Margári is 2 miles to N.

The station was constructed in 1827 for the original triangulation of the Calcutta Longitudinal Series, as a raised platform with two mark-stones, one at the level of the hill summit, the other on the surface of the platform. The upper mark was found in good preservation when the station was visited in 1844, on commencing the Gora Series; the platform was then raised 2 feet, and a new mark-stone inserted on the surface in the normal of the original mark-stone; the new mark-stone was found in good preservation when the station was re-visited in February, 1864, in the course of the revision of the Calcutta Longitudinal Series.

XXXVIII. (*Of Calcutta Longitudinal Series*). Sewádhi Hill Station, lat. $23^{\circ} 58'$, long. $83^{\circ} 48'$, has been named after the village Sewádhi, which is situated about 1 mile to the N.W.; district Pálámao. The respectable village of Ranka lies about 2 miles to the N.E.

The station was constructed in 1827 for the original triangulation of the Calcutta Longitudinal Series, and consists of a raised platform with two mark-stones, one on the level of the hill summit, the other on the surface of the platform. The upper mark was found in good preservation when the station was visited in 1844, on commencing the Gora Series, and again in February, 1864, in the course of the revision of the Calcutta Longitudinal Series.

I. Bagdharua Hill Station, lat. $24^{\circ} 33'$, long. $83^{\circ} 32'$, is situated in the Mirzapore district, and stands on a hill, locally called Chaoria, appertaining to the Kaimúr range. The station is on the left bank of the river Son. The circumjacent villages, with their distances and bearings, are,—Barela and Maholi, about $1\frac{1}{4}$ miles to the N.E., and Partí, on the opposite bank of the river, about the same distance to the S.W.

The platform is solid, and about 16 feet in height, with an isolated central paka pillar containing the mark-stones.

II. Kandákot Hill Station, lat. $24^{\circ} 38'$, long. $83^{\circ} 3'$, is situated in the Barhar pargana

of the Mirzapore district, on the Kaimúr range, at a distance of about 4 miles S.E. of the village of Rájpur, and 6 miles S.E. of that of Sháganj. A fort, partially built, stands on the hill not far from the station.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

III. Basoha Hill Station, lat. $24^{\circ} 53'$, long. $83^{\circ} 19'$, is situated in pargana Magrar of the Mirzapore district, and stands on one of the many knolls appertaining to the Bindráchal range. The adjacent villages, with their distances and bearings, are,—Naogarh, about $2\frac{1}{2}$ miles S.; Laoari, about 3 miles to the W.; and Amdáha, 4 miles to the S.W. by W.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

IV. Khorádi Hill Station, lat. $24^{\circ} 54'$, long. $83^{\circ} 1'$, is situated in the Bhagwant pargana of the Mirzapore district, and stands on a knoll rising from a nearly level plot of ground covered with jungle.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

V. Khám Hill Station, lat. $24^{\circ} 47'$, long. $83^{\circ} 34'$, is situated in the Chainpúr pargana of the Sháhábád district, and stands on a swell of ground locally called Sankra, rising out of the table-land to the north of the Kaimúr range. The adjacent villages, with their distances and bearings, are,—Bara Khám, about 1 mile to the S.W., and Bhanera, about $1\frac{1}{2}$ miles to the S.E.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

VI. Garda Hill Station, lat. $24^{\circ} 57'$, long. $83^{\circ} 35'$, is situated in the Chainpúr pargana of the Sháhábád district, and stands on a steep and nearly inaccessible hill, which is separated by a deep ravine from the Bindráchal range of mountains. The run of the hill is W.S.W. and E.N.E., and is about $2\frac{1}{2}$ miles in length. The ascent to the station is very steep, and is made from the village of Rámgarh, which lies at the foot of the hill to the E.N.E., at a distance of $2\frac{1}{2}$ miles. The city of Chainpúr is about 7 miles to the N.E.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

VII. Sikri Tower Station, lat. $25^{\circ} 12'$, long. $83^{\circ} 15'$, is situated in the Majwar pargana of the Benares district, and stands on a small mound, at the northern skirt of the village after which it is named. The adjacent places, with their distances and bearings, are,—Babúri village, about $1\frac{1}{2}$ miles S.W., and Chanoli thana, on the Grand Trunk road, about $5\frac{1}{2}$ miles to the N.E.

The tower is solid and circular, diameter 18 feet at base, and $15\frac{1}{2}$ at summit, height 27 feet. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, another at bottom, and three others intermediate.

VIII. Barhání Tower Station, lat. $25^{\circ} 18'$, long. $83^{\circ} 27'$, is situated in the Narwan

pargana of the Benares district, and stands on a small mound at the edge of a tank near the road leading from Sadraza to Amra, which latter is distant nearly half a mile to the W. of the village of Barhání.

The tower is solid and circular, diameter 32 feet at base and 16 at summit, height 27 feet; an isolated central paka pillar contains the mark-stones.

IX. Hirdepúr Tower Station, lat. $25^{\circ} 24'$, long. $83^{\circ} 17'$, is situated in the Mohuári pargana of the Benares district, and stands on a mound about 400 yards S.S.W. of the village of that name, and half a mile south of the road from Benares *via* Balúa to Ghazeepore.

The tower is solid and circular, diameter 17 feet at base and 15 at summit, height about 32 feet; an isolated central paka pillar contains the mark-stones.

X. Barhánpúr Tower Station, lat. $25^{\circ} 32'$, long. $83^{\circ} 26'$, is situated in pargana Bhitri of the Ghazeepore district, and stands on the raised bank of a tank distant about 200 yards to the N.E. of the village from which it takes its name. The road from Benares to Ghazeepore passes about $\frac{1}{4}$ of a mile to the N., and the village of Dharwa lies about $1\frac{1}{2}$ miles to the N.E. by E. of the station.

The tower is solid and circular, diameter 25 feet at base and 14 feet at summit, height 22 feet; an isolated central paka pillar contains the mark-stones.

XI. Gaora Tower Station, lat. $25^{\circ} 38'$, long. $83^{\circ} 17'$, is situated in pargana Bhitri of the Ghazeepore district, and stands on a high mound surrounded by the scattered hamlet of Gaora.

The tower is solid and circular, diameter 25 feet at base and $13\frac{1}{2}$ feet at summit, height about 20 feet; an isolated central paka pillar contains the mark-stones.

XII. Kanáon Tower Station, lat. $25^{\circ} 43'$, long. $83^{\circ} 26'$, is situated in the Ghazeepore district, and stands on a small mound, about 100 yards to the N.N.E. of the principal portion of the scattered village of Kanáon. The villages of Rámpúr and Perojpúr are distant about 7 miles to the S.E. by E., and Sikhári factory, $2\frac{1}{4}$ miles to the E. by N.

The tower is solid and circular, diameter 21 feet at base and 15 at summit, height about 20 feet; an isolated central paka pillar contains the mark-stones.

XIII. Kharakpúr Tower Station, lat. $25^{\circ} 50'$, long. $83^{\circ} 16'$, is situated in pargana Belbahans of the Azimgarh district, and stands on a mound about 50 yards square, said to be the site of an old fort. The village of Kharakpúr lies scattered at a distance of 100 yards to the west, north, and north-east of the station.

The tower is solid and circular, diameter 25 feet at base and 15 at summit, height about 20 feet. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, and another at bottom.

XIV. Chit Bistrám Tower Station, lat. $25^{\circ} 54'$, long. $83^{\circ} 26'$, is situated in the Mahamdábád pargana of the Azimgarh district, and stands on a mound at the edge of a small tank, surrounded by the scattered village of Chit Bistrám.

The tower is solid and circular, diameter 25 feet at base and 15 at summit, height about 23 feet; an isolated central paka pillar contains the mark-stones.

XV. Samenda Tower Station, lat. $26^{\circ} 0'$, long. $83^{\circ} 16'$, is situated in the Mahamdábád pargana of the Azimgarh district, and stands on the bank of a tank adjoining the S.W. side of the large village of Samenda. The town of Azimgarh is distant 4 miles to the N.W. by N.

The tower is solid and circular, diameter 21 feet at base and 16 at summit, height 25 feet; an isolated central paka pillar contains the mark-stones.

XVI. Bhádir Tower Station, lat. $26^{\circ} 5'$, long. $83^{\circ} 26'$, is situated in the Mahamdábád pargana of the Azimgarh district, and stands close to the south side of the village of that name.

The tower is solid and circular, diameter 21 feet at base and $16\frac{1}{2}$ at summit, height about 33 feet; an isolated central paka pillar contains the mark-stones.

XVII. Balariáganj Tower Station, lat. $26^{\circ} 12'$, long. $83^{\circ} 16'$, is situated in pargana Sagri of the Azimgarh district, and stands on the east side of a tank 300 yards N.E. of the large village of Balariáganj.

The tower is solid and circular, diameter 21 feet at base and 16 at summit, height about 33 feet; an isolated central paka pillar contains the mark-stones.

XVIII. Baniápár Tower Station, lat. $26^{\circ} 15'$, long. $83^{\circ} 25'$, is situated in the Sagri pargana of the Azimgarh district, and stands on a slight elevation at the south side of the hamlet of Baniápár. The village of Badíha is distant half a mile to the W. The station is in the kadar land of the river Ghágra.

The tower is solid and circular, diameter 21 feet at base and 17 at summit, height 25 feet; an isolated central paka pillar contains the mark-stones.

XIX. Barhiáchak Tower Station, lat. $26^{\circ} 21'$, long. $83^{\circ} 16'$, is situated in pargana Dhuríápúr of the Goruckpore district, and stands on the south-west side of the small village of Barhiáchak. The station is in the kadar land of the river Ghágra.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 28 feet in height; an isolated central paka pillar contains the mark-stones.

XX. Rájgarh Tower Station, lat. $26^{\circ} 25'$, long. $83^{\circ} 26'$, is situated in the Dhuríápúr pargana of the Goruckpore district, and stands contiguous to the southern side of the village after which it is named.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 26 feet in height; an isolated central paka pillar contains the mark-stones.

XXI. Bhisía Tower Station, lat. $26^{\circ} 29'$, long. $83^{\circ} 12'$, is situated in pargana Bhowapúr of the Goruckpore district, and stands on a small mound within the village of that name, on the right bank of the Kuána stream.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 23 feet in height; an isolated central paka pillar contains the mark-stones.

XXII. Katwar Tower Station, lat. $26^{\circ} 34'$, long. $83^{\circ} 20'$, is situated in pargana Anaol

of the Goruckpore district, and stands on a slight elevation 200 yards S.E. of the small village of Katwar, and 300 yards N.N.W. of the Bitāha indigo factory.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 23 feet in height. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, and another at bottom.

XXIII. Deokali Tower Station, lat. $26^{\circ} 38'$, long. $83^{\circ} 8'$, is situated in the Maholi pargana of the Goruckpore district, and stands on a small mound contiguous to the south side of the hamlet of that name. The village of Mulapūr is distant 1 mile to the N.E.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 23 feet in height. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, and another at bottom.

XXIV. Saraia Tower Station, lat. $26^{\circ} 44'$, long. $83^{\circ} 19'$, is situated in pargana Bhowapūr of the Goruckpore district, and stands on the eastern bank of a tank 300 yards N.E. of the village of Saraia. The road from Goruckpore to Bakhra passes close to the station to the south. The town of Goruckpore lies about 4 miles towards the E. The circumjacent villages, with their distances and bearings, are,—Bargahān, about $\frac{1}{2}$ a mile to the E.N.E.; Kalesar, about $1\frac{1}{2}$ miles to the N.W. by W., and Máhamadpūr, about $2\frac{1}{2}$ miles to the N.N.W.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 28 feet in height; an isolated central paka pillar contains the mark-stones.

XXV. Máhamadpūr Tower Station, lat. $26^{\circ} 46'$, long. $83^{\circ} 9'$, is situated in the Maghar pargana of the Goruckpore district, and stands about 150 yards to the north of the deserted village of that name on the left bank of the Ami stream. The large village of Maghar is distant $2\frac{1}{2}$ miles to the E. by S.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 28 feet in height; an isolated central paka pillar contains the mark-stones.

XXVI. Rājābāri Tower Station, lat. $26^{\circ} 54'$, long. $83^{\circ} 18'$, is situated in pargana Haveli Goruckpore of the Goruckpore district, and stands on a mound 80 yards W. of the village of that name. The river Rāpti flows to the west of the station, at a distance of half a mile, and the village of Aiasoál is distant nearly 200 yards to the W. by N.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 28 feet in height; an isolated central paka pillar contains the mark-stones.

XXVII. Nandāor Tower Station, lat. $26^{\circ} 57'$, long. $83^{\circ} 7'$, is situated in pargana Maghar of the Basti district, and stands about 200 yards to the S.E. of the village of Nandāor. The road from Goruckpore to Báñsi passes close to the station, and the town of Bakhra is distant $1\frac{1}{2}$ miles to the S.E.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 26 feet in height. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, and another at bottom.

LVI. (*Of the North-East Longitudinal Series*). Dharamsingua Tower Station, lat. $27^{\circ} 5'$,

long. $83^{\circ} 7'$, is situated in pargana Báñsi of the Goruckpore district, and stands on the bund of a tank 200 yards E.S.E. of Dharamsingua village, and 300 yards S.W. of that of Gaori-Rái.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 25 feet high; an isolated central paka pillar contains the mark-stones. It was found in good preservation when the station was visited in 1849, in the course of the North-East Longitudinal Series.

LVIII. (*Of the North-East Longitudinal Series*). Gharbaria Tower Station, lat. $27^{\circ} 3'$, long. $83^{\circ} 18'$, is situated in pargana Haveli Goruckpore of the Goruckpore district, and stands 50 yards within the western verge of the forest. The Gúñghi nadi flows at about 1·8 miles to the W. The village of Gharbaria, near the road from Karmeni Ghat to Máhádeoa, is distant about 80 yards to the N.W.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 25 feet high; an isolated central paka pillar contains the mark-stones. It was found in good preservation when the station was visited in 1849, in the course of the North-East Longitudinal Series.

GORA MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives additional information as to position, construction, and present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Villages surrounding the Station	Remarks on the Construction and Condition of the Station
XXXV	Gohnda	Mirzapur	Tah. Roberts- ganj, P. Sing- rauli, Thá. Chaupán	Gohnda	...	In 1866 a square protecting pillar of masonry was built over the circular pillar on which the large theodolite stood and which carries the true mark-stone. The square pillar is $3\frac{1}{2}$ feet high, 28 inches square at base and 20 inches at top, and bears a sufficiently accurate mark for Topographical and Revenue Survey purposes, so that it is unnecessary to refer to the mark-stone which thus remains concealed and protected. A pyramidal pile of earth and stones, 7 feet square at base and 6 feet high, covers the protecting pillar.
XXXVIII	...	Lohardugga	P. Palamow, Thá. Rámkunda	Sewádhi	...	... ..
I	Barela Ma- huli	Mirzapur	Tah. Roberts- ganj, P. Bijai- garh, Thá. Pan- naganj	Barela Mahuli	...	The pillar fallen down as re- ported in 1876.
II	Kandákot	"	Tah. and Thá. Robertsganj, P. Barhar	Bahuara	...	The top of the pillar broken as reported in 1875.
III	Simra	"	Tah. Chakia, P. Kera Mang- raur, Thá. Ah- raura	Simra	...	... ..
IV	Khorádi	Mirzapur	Tah. and Thá. Chunar, P. Bhagwant	Khorádi	...	... ..

NOTE.—Stations XXXV and XXXVIII appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.
tahsil, and Thá. for thána.

P. stands for pargana, Tah. for

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Villages surrounding the Station	Remarks on the Construction and Condition of the Station
V	Khám	Shahabad	Thá. Bhubooah, P. Chainpur	Khám	...	...
VI	Garda or Ghari	"	Thá. Mohania, P. Chainpur	Ghari	...	...
VII	Sikri	Benares	Tah. Chandauli, P. Majwar	Sikri	...	...
VIII	Barhání	"	Tah. Chandauli, P. Narwan	Barhání	...	...
IX	Hirdepur	"	Tah. Chandauli, P. Mohuári	Hirdepur	...	...
X	Barhanpur	Ghazipur	Tah. Sayyidpur, P. Bhítari, Thá. Nandganj	Barhanpur Seh Patti	...	...
XI	Gaura	"	Tah. Sayyidpur Bhítari, P. Bahariabad, Thá. Sádát	Gaura	Sádát miles N. E. by E. $4\frac{1}{2}$ Makdumpur W. N. W. $1\frac{1}{2}$	Upper portion of the tower, nearly 2 feet, broken as reported in 1867.
XII	Kanaun	"	Tah. Ghazipur, P. and Thá. Shádiabad	Kanaun	Koiri S. S. W. $3\frac{1}{2}$	No trace of the station found as reported in 1874.
XIII	Kharakpur	Azamgarh	Tah. Deogaon, P. Belhabáns, Thá. Chiriakot	Kharakpur	Belha S. by W. 4 Maholi S. W. by W. $5\frac{1}{2}$	...
XIV	Chit Bistrám	"	Tah. and P. Muhammadabad	Chit Bistrám	Ránípur N. E. by E. 2 Chiriakot W. S. W. $4\frac{1}{2}$	...
XV	Samenda	"	Ditto.	Samenda	Amaun E. 4 Mitupur S. by E. $3\frac{1}{2}$	...
XVI	...	"	...	...	...	There is no mark of mound or pillar at this spot over which the zamíndár has built a hut, as reported in 1867.
XVII	Balariaganj	"	Tah., P. and Thá. Sagri	Balariaganj	Akbarpur N. E. $1\frac{1}{2}$ Ramipur S. S. W. 2 Bachaur E. by N. $3\frac{1}{2}$	"The upper part of each of these towers is knocked down to a certain extent, and the stonework in each case is not in existence", as reported in 1867.
XVIII	Baniapár	"	Tah. and P. Sagri, Thá. Raunapár	Baniapár	Máhula E. S. E. 4 Bardeha W. $1\frac{1}{2}$ Muhammadpur S. by E. $2\frac{3}{4}$	
XIX	...	Gorakhpur	Tah. Bánsgaon, P. Dhumapár, Thá. Kothibhár	Barhiachak	Sháhpur N. $3\frac{1}{2}$ Ratanpur N. E. $3\frac{1}{2}$	"Now only a kacha masonry mound 15 feet high exists", as reported in 1874.

NOTE.—P. stands for pargana, Tah. for tahsil, and Thá. for thána.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Villages surrounding the Station	Remarks on the Construction and Condition of the Station
XX	...	Gorakhpur	Tah. Bánsgaon, P. Dhuriapár, Thá. Kothibhár	Rájgarh	Naribuzurg miles N. E. 1½ Kohari S. by E. 1	Now only a mound 18 feet high exists as reported in 1874.
XXI	...	...	...	...	...	Entirely swept away by the Kuána stream as reported in 1870.
XXII	...	Gorakhpur	Tah. Bánsgaon, P. Anaul, Thá. Kothibhár	Katwar	Sháhpur Kabra E. S. E. 3½ Bhadar W. by S. 4½ Babhnauli S. S. E. 2½	A paka pillar 19 feet high exists from which bricks have come out here and there as reported in 1874.
XXIII	Deokali	Basti	Tah. Khalílabad, P. and Thá. Mahuli	Deokali	...	In a state of complete ruin as reported in 1879.
XXIV	...	Gorakhpur	Tah. Sadar, P. Bhowapur, Thá. Kotwáli	Bargahán	...	No mark-stone is in existence. The station is about 9 feet in height, as reported in 1867.
XXV	...	"	Tah. Sadar, P. Maghar, Thá. Saljanwa	Muhammadpur	...	"No mark-stone is in existence. The station is about 24 feet in height", as reported in 1867.
XXVI	...	"	Tah. Sadar, P. Haveli, Thá. Ragauli	Rájabári	...	No mark-stone in existence, part of the station has been injured: it is about 6 feet high, as reported in 1867.
XXVII	Nandaur	Basti	Tah. Khalílabad, P. Hasanpur Maghar, Thá. Mihndáwal	Nandaur	...	...
LVI	Dharam-singua	"	Tah. and P. Bánsi, Thá. Májhra	Dharam-singua	Sahti W. 1 Fatehpur N. W. 1½ Jamia E. by S. 2½	The station as built in 1847 consists of a solid tower, 20 feet square at base, 14 feet at top, and about 25 feet high, enclosing a central, isolated pillar of masonry which contains mark-stones. When again visited in 1849, in the course of the North-East Longitudinal Series operations, it was found in good preservation, and no alteration in its construction appears to have been made.
LVIII	...	Gorakhpur	Tah. Maharáj-ganj, P. Haveli, Thá. Ragauli	Gharbaria	Ragauli S. W. 2½	The station as built in 1847 consists of a solid tower, 20 feet square at base, 14 feet at top, and about 25 feet high, enclosing a central, isolated and perforated pillar of masonry which contains mark-stones. When again visited in 1849, in the course of the North-East Longitudinal Series operations, it was found in good preservation, and no alteration in its construction appears to have been made. Part of the tower injured, and no mark-stone found, as reported in 1867.

NOTE.—Stations LVI and LVIII appertain to the North-East Longitudinal Series.

P. stands for pargana, Tah. for tahsil, and Thá. for thána.

August, 1882.

 J. B. N. HENNESSEY,
In charge of Computing Office.

GORA MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. TRIANGLES.

NOTE.—The preceding pages, 1—0. to 8—0., having been printed in 1869, the spelling of Indian proper names occurring in them is in accordance with the Departmental or old rules; these prevailed until 1874, when the Government or new rules for spelling were published. The transition now (1879) necessary from the old to the new rules is effected hereafter as follows. Names not already printed are rendered by only one method of spelling, *i.e.*, the new. Any name that has appeared in the preceding pages is given by both methods, *viz.*, in Roman type by the new rules and in Italics by the old; to avoid needless repetitions, this is done *only* in the *first* instance that a name of the kind occurs. It will be seen that the two methods of spelling differ but slightly.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
1	Gora, XXXV	2'57	75 49 6'52	5'3530121	225430'2	42'695
	Sewádhi, XXXVIII	2'56	54 40 18'32	5'2780650	189699'0	35'928
	Bagdharua, I	2'56	49 30 35'16	5'2475620	176832'5	33'491
2	Gora, XXXV	2'39	48 13 57'32	5'2220843	166757'1	31'583
	Bagdharua, I	2'40	73 43 19'36	5'3316618	214615'9	40'647
	Kandákot, II	2'39	58 2 43'32	5'2780650	189699'0	35'928
3	Bagdharua, I	1'39	48 22 31'19	5'1091679	128578'4	24'352
	Kandákot, II	1'40	55 49 7'51	5'1531940	142296'4	26'950
	Basoha, III	1'40	75 48 21'30	5'2220843	166757'1	31'583
4	Bagdharua, I	57	35 36 45'40	4'9409101	87279'1	16'530
	Basoha, III	58	36 4 33'36	4'9457716	88261'6	16'716
	Khám, V	58	108 18 41'24	5'1531940	142296'4	26'950
5	Basoha, III	38	38 12 20'78	4'7665010	58411'9	11'063
	Khám, V	39	74 15 16'04	4'9585601	90899'2	17'216
	Garda, VI	39	67 32 23'18	4'9409101	87279'1	16'530

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Gora, XXXV, and Sewádhi, XXXVIII appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
6	Basoha, III	84	85 3 40'24	5'1523208	142010'6	26'896
	Garda, VI	84	55 19 2'96	5'0689759	117213'0	22'199
	Sikri, VII	83	39 37 16'80	4'9585601	90899'2	17'216
7	Garda, VI	78	31 34 47'74	4'8772941	75386'6	14'278
	Sikri, VII	78	67 50 37'97	5'1249077	133323'8	25'251
	Barhāni, VIII	78	80 34 34'29	5'1523208	142010'6	26'896
8	Kandākot, II	79	50 52 20'76	5'0065581	101521'5	19'228
	Basoha, III	78	49 51 56'81	5'0002386	100054'9	18'950
	Khorādi, IV	79	79 15 42'43	5'1091679	128578'4	24'352
9	Basoha, III	91	74 59 2'62	5'1261766	133713'9	25'325
	Khorādi, IV	90	57 51 2'08	5'0689759	117213'0	22'199
	Sikri, VII	90	47 9 55'30	5'0065581	101521'5	19'228
10	Basoha, III	95	57 50 48'51	5'1249077	133323'8	25'251
	Garda, VI	96	86 53 51'36	5'1965780	157245'4	29'781
	Barhāni, VIII	95	35 15 20'13	4'9585601	90899'2	17'216
11	Sikri, VII	37	56 6 54'51	4'8501795	70823'8	13'414
	Barhāni, VIII	37	61 48 0'08	4'8761434	75187'1	14'240
	Hirdepur (<i>Hirdepūr</i>), IX	38	62 5 5'41	4'8772941	75386'6	14'278
12	Barhāni, VIII	39	52 38 5'56	4'8528341	71258'1	13'496
	Hirdepur, IX	39	75 11 6'52	4'9379023	86676'7	16'416
	Barhanpur (<i>Barhānpūr</i>), X	38	52 10 47'92	4'8501795	70823'8	13'414
13	Hirdepur, IX	34	47 29 3'82	4'7973166	62707'1	11'876
	Barhanpur, X	35	75 37 38'64	4'9159843	82410'8	15'608
	Gaura (<i>Gaura</i>), XI	34	56 53 17'54	4'8528341	71258'1	13'496
14	Barhanpur, X	26	54 35 45'81	4'7727365	59256'6	11'223
	Gaura, XI	27	65 47 59'12	4'8215832	66310'6	12'559
	Kanaun (<i>Kandon</i>), XII	27	59 36 15'07	4'7973166	62707'1	11'876
15	Gaura, XI	30	62 22 33'62	4'8452193	70019'6	13'261
	Kanaun, XII	31	69 2 57'90	4'8680763	73803'4	13'978
	Kharakpur (<i>Kharakpūr</i>), XIII	30	48 34 28'48	4'7727365	59256'6	11'223
16	Kanaun, XII	29	52 9 49'20	4'7790468	60123'9	11'387
	Kharakpur, XIII	29	60 56 46'98	4'8231421	66549'1	12'604
	Chit Bisram, XIV	29	66 53 23'82	4'8452193	70019'6	13'261
17	Kharakpur, XIII	28	68 6 55'07	4'8355919	68484'4	12'971
	Chit Bisram, XIV	27	57 19 53'76	4'7932873	62128'0	11'767
	Samenda, XV	27	54 33 11'17	4'7790468	60123'9	11'387
18	Chit Bisram, XIV	30	56 19 47'60	4'8101702	64590'7	12'233
	Samenda, XV	31	61 44 6'67	4'8347814	68356'8	12'946
	Bhadir (<i>Bhādīr</i>), XVI	31	61 56 5'64	4'8355919	68484'4	12'971
19	Samenda, XV	31	60 32 10'80	4'8337564	68195'6	12'916
	Bhadir, XVI	31	63 54 40'67	4'8472356	70345'4	13'323
	Balariāganj (<i>Balariāganj</i>), XVII	31	55 33 8'53	4'8101702	64590'7	12'233
20	Bhadir, XVI	24	48 39 29'51	4'7260752	53220'0	10'080
	Balariāganj, XVII	24	57 10 41'51	4'7750267	59569'9	11'282
	Baniāpār (<i>Bāniāpār</i>), XVIII	24	74 9 48'98	4'8337564	68195'6	12'916

PRINCIPAL TRIANGULATION. TRIANGLES.

11—o.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
21	Balariáganj, XVII	" 22	71 56 50'29	4'8021156	63403'8	12'008
	Baniápár, XVIII	" 22	55 6 26'60	4'7379726	54698'2	10'359
	Barhiáchak (<i>Barhiáchak</i>), XIX	" 21	52 56 43'11	4'7260752	53220'0	10'080
22	Baniápár, XVIII	" 25	55 57 26'99	4'7673367	58524'4	11'084
	Barhiáchak, XIX	" 25	60 11 2'18	4'7873126	61279'1	11'606
	Rájgarh, XX	" 26	63 51 30'83	4'8021156	63403'8	12'008
23	Barhiáchak, XIX	" 24	85 23 48'06	4'8741104	74836'0	14'173
	Rájgarh, XX	" 23	43 23 14'43	4'7124241	51573'2	9'768
	Bhisia (<i>Bhisia</i>), XXI	" 24	51 12 57'51	4'7673367	58524'4	11'084
24	Rájgarh, XX	" 24	44 38 26'21	4'7237514	52936'0	10'026
	Bhisia, XXI	" 24	51 58 12'82	4'7733634	59342'2	11'239
	Katwar, XXII	" 25	83 23 20'97	4'8741104	74836'0	14'173
25	Bhisia, XXI	" 24	77 27 20'45	4'8440192	69826'3	13'225
	Katwar, XXII	" 24	54 48 42'56	4'7668745	58462'1	11'072
	Deokali, XXIII	" 23	47 43 56'99	4'7237514	52936'0	10'026
26	Katwar, XXII	" 30	62 29 49'24	4'8389174	69010'9	13'070
	Deokali, XXIII	" 30	53 40 32'80	4'7971617	62684'7	11'872
	Saraia, XXIV	" 31	63 49 37'96	4'8440192	69826'3	13'225
27	Deokali, XXIII	" 22	51 28 19'53	4'7385104	54765'9	10'372
	Saraia, XXIV	" 22	48 11 58'08	4'7175644	52187'3	9'884
	Muhammadpur (<i>Máhamadpur</i>), XXV	" 22	80 19 42'34	4'8389174	69010'9	13'070
28	Saraia, XXIV	" 25	70 5 29'23	4'8201488	66092'0	12'517
	Muhammadpur, XXV	" 24	58 43 45'58	4'7787376	60081'1	11'379
	Rájabári (<i>Rájábári</i>), XXVI	" 24	51 10 45'19	4'7385104	54765'9	10'372
29	Muhammadpur, XXV	" 27	57 32 46'20	4'7935789	62169'7	11'775
	Rájabári, XXVI	" 28	58 40 46'09	4'7989235	62939'5	11'920
	Nandaur (<i>Nandáur</i>), XXVII	" 28	63 46 27'71	4'8201488	66092'0	12'517
30	Rájabári, XXVI	" 25	72 18 26'32	4'8365002	68627'8	12'998
	Nandaur, XXVII	" 25	48 1 55'66	4'7288365	53559'5	10'144
	Gharbaria, LVIII	" 25	59 39 38'02	4'7935789	62169'7	11'775
31	Nandaur, XXVII	" 23	59 18 50'34	4'7837907	60784'2	11'512
	Gharbaria, LVIII	" 23	44 31 49'93	4'6952012	49568'0	9'388
	Dharamsingua, LVI	" 23	76 9 19'73	4'8365002	68627'8	12'998

NOTE.—Dharamsingua, LVI, and Gharbaria, LVIII appertain to the North-East Longitudinal Series.

February 1879.

J. B. N. HENNESSEY,
In charge of Computing Office.

GORA MERIDIONAL SERIES. **SECONDARY TRIANGULATION. TRIANGLES.**

PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles		
32	Gora, XXXV Sewádhí, XXXVIII Pipardar	107 4 48 35 8 49 37 46 23	5.440841 5.220609 5.247562	275957 166191 176833	52.265 31.476 33.491	37	Gora, XXXV Khempur Kandwa	16 49 2 30 44 40 132 26 18	4.693195 4.940416 5.099876	49340 87180 125857	9.345 16.511 23.836	15 7 "	Theodolite used
33	Gora, XXXV Bagdharua, I Pipardar	31 15 39 61 5 9 87 39 12	4.993542 5.220609 5.278065	98524 166191 189699	18.660 31.476 35.928	38	Khempur Kandwa Bahráddol Hill Mark (Heliotrope)	55 40 56 78 8 25 40 13 46	4.751905 4.825595 4.693195	56481 66926 49340	10.697 12.675 9.345	" " "	
34	Bagdharua, I Pipardar Khempur	36 31 40 94 36 52	4.769624 4.871793 4.993542	58833 74438 98524	11.143 14.098 18.660	39	Gora, XXXV Kandwa Bahráddol Hill Mark (Heliotrope)	54 17 53 77 50 33 3 35 16	4.751905 4.851364 5.099876	56481 71017 125857	10.697 13.450 23.836	15 7 "	
35	Gora, XXXV Bagdharua, I Khempur	14 13 48 24 33 29 141 12 43	4.871793 5.099876 5.278065	74438 125857 189699	14.098 23.836 35.928	40	Gora, XXXV Khempur Mirgaráni	77 50 33 3 35 16 27 9 24	5.094901 3.901171 4.922271	124423 7065 83612	23.565 1.508 15.836	15 7 "	
36	Bagdharua, I Khempur Kandwa	26 45 16 110 28 3 42 46 41	4.693195 5.011500 4.871793	49340 102683 74438	9.345 19.448 14.098	41	Khempur Kandwa Mirgaráni	137 13 7 4.693195	5.094901 4.693195	124423 49340	23.565 9.345	" "	

NOTES.—1. Names followed by Roman numerals are those of Principal Stations.
Quadrilateral.

2. The values of the side are given in the same line with the opposite angle.

Stations Gora, XXXV, and Sewádhí, XXXVIII appertain to the Calcutta Longitudinal Series of the South-East

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
42	Bagdharua, I Pipardar Magarda	h.s. " "	4° 30' 139 4° 30' 139 4° 30' 139	20330 81400 98524	3° 8' 50 15° 41' 7 18° 66' 0	55	Kandakot, II Mangesar Hill Mark Súrhan Ghat (Pass)	h.s. " "	4° 62' 7913 3° 82' 3815 4° 64' 7063	42453 6665 44367	8° 04' 0 1° 26' 2 8° 40' 3	Inch 15 7
43	Pipardar Magarda Bijagarh	h.s. " "	4° 35' 7327 4° 35' 7327 4° 35' 7327	22768 14301 20330	4° 31' 2 2° 70' 9 3° 8' 50	56	Kandakot, II Khorádi, IV Dibar Hill Mark	h.s. " "	5° 00' 6300 4° 61' 5886 5° 00' 0239	101461 41294 100055	19° 21' 6 7° 82' 1 18° 95' 0	15 " "
44	Bagdharua, I Pipardar Bijagarh	h.s. " "	4° 15' 5372 5° 01' 7693 4° 99' 3542	14301 104158 98524	2° 70' 9 19° 72' 7 18° 66' 0	57	Magarda Bijagarh Rangarh Building	h.s. " "	4° 37' 4140 4° 33' 9791 4° 35' 7327	37509 34657 22768	7° 10' 4 6° 56' 4 4° 31' 2	7 " "
45	Gora, XXXV Mingarani Murgari Hill Mark (heliotrope)	h.s. " "	4° 19' 2693 4° 12' 0065 3° 90' 1171	15585 13185 7965	2° 95' 2 2° 49' 7 1° 50' 8	58	Bagdharua, I Kham, V Moraina	h.s. " "	4° 49' 5415 5° 05' 7836 4° 94' 5772	31291 114245 88262	5° 92' 6 21° 63' 7 16° 71' 6	12 15
46	Khempur Kandwa Kona Building	h.s. " "	4° 68' 7997 4° 01' 6830 4° 69' 3195	48753 10395 49340	9° 23' 3 1° 96' 9 9° 34' 5	59	Kandakot, II Khorádi, IV Surharia No. 1	h.s. " "	4° 06' 122 5° 09' 5647 5° 00' 0239	91648 124637 100055	17° 35' 8 23° 60' 5 18° 95' 0	" 7
47	Khempur Kandwa Kona Temple No. 1	h.s. " "	4° 69' 0687 4° 04' 7184 4° 69' 3195	50083 11148 49340	9° 48' 5 2° 11' 1 9° 34' 5	60	Kandakot, II Basoha, III Surharia No. 1	h.s. " "	4° 01' 2342 5° 09' 5647 5° 10' 9168	10288 124637 128578	1° 94' 9 23° 60' 5 24° 35' 2	15 7
48	Khempur Kandwa Kona Temple No. 2	h.s. " "	4° 71' 2089 4° 00' 1631 4° 69' 3195	51533 10038 49340	9° 76' 0 1° 90' 1 9° 34' 5	61	Kandakot, II Surharia No. 1 Surharia No. 2	h.s. " "	3° 84' 5538 5° 09' 1182 5° 09' 5647	7007 123362 124637	1° 32' 7 23° 36' 4 23° 60' 5	" "
49	Pipardar Bijagarh Gidwas Hill Mark	h.s. " "	4° 41' 4816 4° 29' 1051 4° 15' 5372	25991 19546 14301	4° 92' 2 3° 70' 2 2° 70' 9	62	Basoha, III Surharia No. 1 Surharia No. 2	h.s. " "	3° 84' 5538 3° 76' 0880 4° 01' 2342	7007 5766 10288	1° 32' 7 1° 09' 2 1° 94' 9	15 7 "
50	Pipardar Bijagarh Bajnath Hill Mark	h.s. " "	4° 62' 6458 4° 52' 2126 4° 15' 5372	42311 33276 14301	8° 01' 4 6° 30' 2 2° 70' 9	63	Basoha, III Surharia No. 2 Nangarh Building	h.s. " "	4° 15' 9196 4° 20' 0403 3° 76' 0880	14428 15864 5766	2° 73' 3 3° 00' 4 1° 09' 2	15 7
51	Pipardar Magarda Bajnath Hill Mark	h.s. " "	4° 34' 2668 4° 52' 2126 4° 30' 8139	22012 33276 20330	4° 16' 9 6° 30' 2 3° 8' 50	64	Basoha, III Surharia No. 1 Basoha	h.s. " "	3° 93' 039 4° 15' 9166 4° 01' 2342	8571 14393 10288	1° 62' 3 2° 72' 6 1° 94' 9	" "
52	Bagdharua, I Pipardar Kothadei Platform	h.s. " "	4° 89' 6809 4° 32' 2718 4° 99' 3542	78868 21024 98524	14° 93' 7 3° 98' 2 18° 66' 0	65	Basoha, III Surharia No. 2 Basoha	h.s. " "	4° 15' 2870 4° 15' 8166 3° 76' 0880	14219 14393 5766	2° 69' 3 2° 72' 6 1° 09' 2	" "
53	Kandakot, II Basoha, III Mangesar Hill Mark	h.s. " "	5° 16' 2144 4° 64' 7063 5° 10' 9168	145259 44367 128578	27° 51' 1 8° 40' 3 24° 35' 2	66	Basoha, III Surharia No. 1 Surharia Hill Mark	h.s. " "	4° 23' 4792 4° 31' 9335 4° 01' 2342	17171 20871 10288	3° 25' 2 3° 95' 3 1° 94' 9	15 7
54	Basoha, III Khorádi, IV Mangesar Hill Mark	h.s. " "	5° 15' 0105 5° 16' 2144 5° 00' 6558	141288 145259 101522	26° 75' 9 27° 51' 1 19° 22' 8	67	Garda, VI Sikri, VII Chainpur	h.s. " "	5° 03' 8413 4° 54' 4287 5° 15' 2321	109248 35018 142011	20° 69' 1 6° 63' 2 26° 89' 6	15 7

NOTE.—Station Gora, XXXV appertains to the Calcutta Longitudinal Series of the South-East Quadrilateral.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
68	Sikri, VII Barhni, VIII Chainpur	h.s. 75 50 49 41 59 53	4.998357 5.038413 4.877294	99622 100248 73387	15 20.691 14.278	81	Sikri, VII Barhni Deobal	h.s. 76 28 3	4.323024 4.789118 4.779549	21039 61534 60193	3.985 11.654 11.400	Inch 7
69	Garda, VI Chainpur Paharia	h.s. 78 35 5 58 43 2	4.603839 4.443832 4.544287	40164 27786 35018	7.607 5.263 6.632	82	Kota Barhni Majda House	h.s. 118 28 38 12 46 49	4.243678 3.644496 4.175762	17526 4411 14989	3.319 0.835 2.839	"
70	Chainpur Paharia Mahesari	h.s. 44 20 8 118 33 23	4.128778 4.504562 4.603839	13452 31957 40164	2.548 6.052 7.607	83	Kota Barhni Thiari House	h.s. 32 50 30 23 28 1	3.989874 3.855742 4.175762	9770 7174 14989	1.850 1.359 2.839	"
71	Garda, VI Chainpur Mahesari	h.s. 65 49 36 25 35 24 88 35 0	4.504562 4.179831 4.544287	31957 15130 35018	6.052 2.805 6.632	84	Kota Barhni Deheri Siwala	h.s. 76 0 12 29 39 5	4.179088 3.886539 4.175762	15104 7701 14989	2.861 1.458 2.839	"
72	Paharia Mahesari Kangarh Siwala	h.s. 21 28 11 71 4 2	3.602696 4.105049 4.128778	4928 12736 13452	0.933 2.412 2.548	85	Barhni Deobal Sikandarpur Siwala	h.s. 106 10 23	4.390995 4.562956 4.323024	24603 36556 21039	4.660 6.923 3.985	"
73	Paharia Mahesari Bhuboah Temple No. 1	h.s. 133 11 56 17 47 49	4.305867 3.928366 4.128778	20224 8479 13452	3.830 1.066 2.548	86	Kota Barhni Ilia Siwala	h.s. 92 47 55 31 22 9	4.257530 3.974510 4.175762	18094 9430 14989	3.427 1.786 2.839	"
74	Paharia Mahesari Bhuboah Temple No. 2	h.s. 141 9 41 20 1 10	4.417494 4.154594 4.128778	26151 14276 13452	4.953 2.704 2.548	87	Kota Barhni Samra Semaphore	h.s. 28 9 20 140 40 41	4.562544 4.090592 4.175762	36521 49045 14989	6.917 9.289 2.839	"
75	Chainpur Mahesari Chainpur Masjid	h.s. 71 16 38 7 21 19	4.489554 3.620449 4.504562	30871 4173 31957	5.847 0.790 6.052	88	Kota Barhni Parmandapur Semaphore	h.s. 90 55 13 62 9 16	4.519772 4.466384 4.175762	33096 29267 14989	6.268 5.543 2.839	"
76	Chainpur Mahesari Chainpur Siwala	h.s. 57 14 0 11 9 15	4.460956 3.822789 4.504562	28004 6650 31957	5.474 1.259 6.052	89	Barhni Deobal Parmandapur Semaphore	h.s. 24 44 31	4.707659 4.519772 4.323024	51010 33096 21039	9.661 6.268 3.985	"
77	Garda, VI Sikri, VII Kota	h.s. 12 12 0 154 3 4	4.836225 4.887243 5.152321	68584 77134 142011	12.989 14.609 26.896	90	Khoradi, IV Sikri, VII Bhoili	h.s. 16 23 41 19 4 9 144 32 10	4.813245 4.876768 5.126177	65050 75295 133714	12.320 14.260 25.325	15 7
78	Garda, VI Barhni, VIII Kota	h.s. 43 46 49 101 42 49	4.974088 4.887243 5.124908	94208 77134 13324	17.842 14.609 25.251	91	Khoradi, IV Bhoili Magan Diwana	h.s. 11 10 2 25 22 22 143 27 36	4.389041 4.733928 4.876768	24493 54191 75295	4.639 10.263 14.260	15 7
79	Sikri, VII Kota Barhni	h.s. 50 35 30 118 18 57	4.175762 4.775249 4.836225	14989 60193 68584	2.839 11.400 12.989	92	Sikri, VII Bhoili Magan Diwana	h.s. 15 31 35 119 9 48	4.389041 4.902552 4.813245	24493 79901 65050	4.639 15.133 12.320	15 7
80	Sikri, VII Kota Deobal	h.s. 85 35 26	4.548825 4.789118 4.836225	35385 61534 68584	6.702 11.654 12.989	93	Khoradi, IV Magan Diwana Bheri	h.s. 69 30 0 66 32 1 43 57 59	4.864008 4.854929 4.733928	73115 71063 54191	13.848 13.561 10.263	15 7

SECONDARY TRIANGULATION. TRIANGLES.

15-0.

No. of Triangle	Station	Corrected Plane Angle	Distance			No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles				Log. feet	Feet	Miles	
94	Khorádi, IV Bhoili Bheri	h.s. " "	4.855295 4.854929 4.876768	71663 71603 75295	13.573 13.501 14.260	103	Bhoili Bheri Chunar Fort	h.s. " "	4.419725 4.765527 4.855295	26286 58281 71663	4.978 11.038 13.573	Inch 7 "
95	Bhoili Bheri Rája Kirpál-ka-Pahár	h.s. " "	4.861536 4.875562 4.855295	72700 37632 71663	13.769 7.127 13.573	104	Bheri Chunar Fort Murli	h.s. s. h.s.	4.380951 4.098273 4.410239	24041 12539 25718	4.553 2.375 4.871	" " "
96	Magan Diwána Bheri Rája Kirpál-ka-Pahár	h.s. " "	4.861536 4.136169 4.864008	72700 13683 73115	13.769 2.591 13.848	105	Bheri Chunar Fort Murli	h.s. " "	4.379351 4.098273 4.419725	23953 12539 26286	4.536 2.375 4.978	" " "
97	Magan Diwána Rája Kirpál-ka-Pahár Latifgarh Fort	h.s. " "	3.760587 4.281210 4.136169	5762 19108 13683	1.091 3.619 2.591	106	Bheri Chunar Fort Tamalganj Building	h.s. s. h.s.	4.108111 4.177756 4.410239	12827 15058 25718	2.429 2.852 4.871	" " "
98	Magan Diwána Rája Kirpál-ka-Pahár Ahraura Temple	h.s. " "	4.014537 3.973479 4.136169	10340 9408 13683	1.958 1.782 2.591	107	Bheri Chunar Fort Bhoili Semaphore	h.s. s. h.s.	4.762254 4.859799 4.410239	57843 72410 25718	10.955 13.714 4.871	" " "
99	Magan Diwána Rája Kirpál-ka-Pahár Darhana Building	h.s. " "	4.228683 4.011073 4.136169	16931 10258 13683	3.207 1.943 2.591	108	Magan Diwána Bheri Chunar Church	h.s. " "	4.479904 4.818688 4.864008	30193 65916 73115	5.718 12.484 13.848	" " "
100	Khorádi, IV Magan Diwána Chunar Fort	h.s. s. "	4.827239 4.925066 4.733928	67180 84152 54191	12.723 15.938 10.263	109	Bheri Murli Miria Temple	h.s. " "	4.374275 4.438451 4.098273	23674 27444 12539	4.484 5.198 2.375	" " "
101	Magan Diwána Bheri Chunar Fort	h.s. " s.	4.410239 4.827239 4.864008	25718 67180 73115	4.871 12.723 13.848	110	Bheri Chunar Fort Sultánpur Stables	h.s. s. "	4.303100 4.649605 4.410239	20096 44628 25718	3.806 8.452 4.871	" " "
102	Bhoili Rája Kirpál-ka-Pahár Chunar Fort	h.s. " "	4.862780 4.765527 4.575562	72909 58281 37632	13.808 11.038 7.127	111	Sikri, VII Bhoili Benares Mosque	h.s. " "	4.895638 4.882236 4.813245	78639 76249 65050	14.894 14.441 12.320	15 7

February 1879.

J. B. N. HENNESSEY,

In charge of Computing Office.

GORA MERIDIONAL SERIES.

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL, PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance
BAGDHARUA, I		BAIHUI		BARHANI, VIII	
Kandwa	h.s.	Deobal	h.s.	Basoha, III	17 1 56.04
Gora, XXXV*	24 53 58	Sikandarapur Siwála	81	Sikri, VII	62 21 10.03
Khempur	27 5 45.07	Samra Semaphore	85	Hirdepur, IX	124 9 10.48
Kothádei Platform	51 39 14	Sikri, VII	87	Barhanpur, X	176 47 16.43
Pipardar	69 41 29	Parmandápur Semaphore	79	Garda, VI	341 46 34.96
Magarda	88 10 54	Ilia Siwála	88	Chainpur	h.s.
Bijagarh	95 11 50	Deheri Siwála	86		
Kandákoṭ, II	95 37 17	Thiari House	84		
Basoha, III	100 49 6.83	Malda House	83		
Moraina	149 11 39.41	Kota	82	BARHANPUR, X	
Kham, V	174 50 46		79	Hirdepur, IX	48 57 41.97
Sewádhi, XXXVIII*	184 48 25.38			Gaura, XI	124 35 20.96
	337 35 7.35			Kanaun, XII	179 11 7.03
				Barháni, VIII	356 46 53.67
BALARIAGANJ, XVII		BANIAPAR, XVIII			
Samenda, XV	1 52 45.16	Balariáganj, XVII	20	BARHACHAK, XIX	
Parhiáchak, XIX	177 12 4.06	Barhiáchak, XIX	21	Bhisia, XXI	158 40 17.01
Baniápár, XVIII	249 8 54.57	Ráigarh, XX	22	Ráigarh, XX	244 4 5.31
Bhadir, XVI	300 19 36.32	Bhadir, XVI	20	Baniápár, XVIII	304 15 7.74
		BARHANI, VIII		Balariáganj, XVII	357 11 51.06
		Kota	78		

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	Name of station with azimuths of surrounding points	No. of triangle giving distance	
BASOHA, III Nangarh Building Mangesar Hill Mark Kandakot, II Surharia No. 2 Khorádi, IV Surharia No. 1 Basoha Surharia Hill Mark Sikri, VII Barháni, VIII Garda, VI Khám, V Bagdharua, I	63 53 3 62 8 60 64 66 6 10 5 4 3	h.s. h.s. h.s. h.s. h.s. h.s. h.s. h.s. h.s. h.s. h.s. h.s. h.s. h.s.	0 1 " 4 23 12 27 36 25 44 54 31 21 69 34 59 94 46 28 80 110 14 53 146 15 51 165 12 13 169 45 32 33 196 38 23 95 254 49 13 41 293 1 34 57 329 6 8 51	BHOILI h.s. Chunar Fort Benares Mosque Sikri, VII Magan Diwana BHAJGARH h.s. Gidwas Hill Mark Rangarh Building Bagdharua, I Magarda Bajnáth Hill Mark Pipardar CHAINPUR h.s. Sikri, VII Barháni, VIII Chainpur Masjid Chainpur Siwála Pahária Mahesari Garda, VI CHIT BISRAM, XIV Kanaun, XII Kharakpur, XIII Samenda, XV Bhadir, XVI CHUNAR Fort s. Bheri Tamlánj Building Muri Sultánpur Stables Bhoili Semaphore Magan Diwana Khorádi, IV DEOBAL h.s. Sikandarpur Siwála Sikri, VII Parmandápur Semaphore Bahui Kota DEOKALI, XXIII Muhammadpur, XXV Saraia, XXIV Katwar, XXII Bhisia, XXI	102 111 90 91 49 57 44 43 50 43 67 68 75 76 69 70 67 16 16 17 18 101 106 104 110 107 100 100 85 80 89 81 80 27 26 25 25	0 1 " 281 11 55 17 357 21 15 13 7 23 31 43 74 55 55 00 118 2 59 130 14 58 80 148 15 54 161 49 47 32 214 5 30 226 50 59 1 24 35 25 176 20 44 00 238 43 17 98 304 31 17 37 56 45 5 03 101 16 55 19 357 5 26 76 158 45 21 41 169 20 49 h.s. 175 43 42 Murgari H. Mark (Heliotrope) 179 4 18 h.s. 192 45 33 206 59 21 12 209 34 35 270 36 6 282 48 30 21 6 9 42 58 181 24 25 72 228 53 29 88 304 4 36 79 58 47 17 91 127 50 16 12 180 0 5 61 359 11 2 57	DHARAMSINGUA, LVI* Gharbaria, LVIII* Nandaur, XXVII GARDA, VI Khám, V Basoha, III Kota Sikri, VII Chainpur Barháni, VIII Mahesari Pahária GAURA, XI Hirdepur, IX Kharakpur, XIII Kanaun, XII Barhanpur, X GHARBARIA, LVIII* Nandaur, XXVII Dharamsingua, LVI* Rajabári, XXVI GORA, XXXVI† Kandakot, II Bahráol H. Mark (Heliotrope) Pipardar Murgari H. Mark (Heliotrope) Khempur Bagdharua, I Kandwa Mirgaráni Sowádhi, XXXVIII† HIRDEPUR, IX Sikri, VII Gaura, XI Barhanpur, X Barháni, VIII KANAU, XII Gaura, XI Kharakpur, XIII Chit Bisram, XIV Barhanpur, X	31 31 5 5 77 6 67 7 71 69 13 15 14 13 30 31 30 2 39 32 45 35 1 37 40 1 11 13 12 11 14 15 16 14

* Of the North-East Longitudinal Series. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance	Name of station with azimuths of surrounding points	No. of triangles giving distance
KANDAKOT, II Súrhan Ghat (Pass) Dibar Hill Mark Khorádi, IV Surharia No. 1 Surharia No. 2 Basoha, III Bagdharua, I Mangesar Hill Mark Gora, XXXV*	h.s. 37 6 18 93 49 46 173 55 17.62 220 29 32 223 40 35 224 47 39.17 280 36 48.08 327 57 49 338 39 33.79	KEORADI, IV Dibar Hill Mark Bheri Chunar Fort Bhoili Magan Diwana Sikri, VII Surharia No. 1 Basoha, III Mangesar Hill Mark Kandakot, II	55 56 8 59 61 3 2 53 2	h.s. 17 32 38 142 4 4 s. 158 41 44 h.s. 211 34 4 216 47 43.20 272 55 49 274 38 46.18 346 0 26 353 54 29.40	MAHESARI h.s. Bhubooah Temple No. 1 Paharia Rangarh Siwála MIRGARANI h.s. Gora, XXXV* Murgari H. Mark (Heliotrope) Khempur Kandwa MORAINA h.s. Khám, V Bagdharua, I MUHAMMADPUR, XXV Deokali, XXIII Nandaur, XXVII Rajabári, XXVI Sarala, XXIV MURI h.s. Miria Temple Chunar Fort Chunar Fort Bheri NANDAU, XXVII Dharansingua, LVII Gharbaria, LVIII Rajabári, XXVI Muhammadpur, XXV PAHARIA h.s. Rangarh Siwála Garda, VI Mahesari Chainpur Bhubooah Temple No. 1 Bhubooah Temple No. 2 PPARDAR h.s. Gidwas Hill Mark Bijagarh Magarda Bagdharua, I Kothádei Platform Bajnath Hill Mark Khempur Sewádhí, XXXVIII* Gora, XXXV*	73 70 72 40 45 40 41 58 58 27 29 28 27 109 105 104 104 31 30 29 29 72 69 70 69 73 74 49 48 42 33 52 50 34 32 32	
KANDWA h.s. Mirgaráni Gora, XXXV* Bahrádel Hill Mark (Heliotrope) Khempur Kona Temple No. 2 Kona Building Kona Temple No. 1 Bagdharua, I	h.s. 24 50 57 29 37 46 83 55 39 h.s. 162 4 4 173 12 54 174 12 54 174 54 54 204 50 45	KOTA h.s. Deohal Balhui Samra Semaphore Thiari House Sikri, VII Deheri Siwála Parmandápur Semaphore Ila Siwála Barháni, VIII Málda House Garda, VI MAGAN DIWANA h.s. Rája Kirpál-ka-Pahár Latifgarh Fort Khorádi, IV Ahraura Temple Bheri Chunar Fort Chunar Church Bhoili Sikri, VII Darhana Building MAGARDA h.s. Pipardar Bijagarh Rangarh Building Bagdharua, I Bajnath Hill Mark MAHESARI h.s. Garda, VI Chainpur Chainpur Masjid Chainpur Siwála Bhubooah Temple No. 2	41 37 38 36 48 46 47 36 24 25 26 24 4 4 5 17 16 15 15 40 35 38 34 34 48 47 46 36	h.s. 80 27 38 93 10 12 121 28 32 126 9 42 143 54 42 169 19 24 184 14 25 186 7 7 196 14 57 211 47 50 297 57 46 h.s. 15 15 0 22 8 5 31 36 14 64 16 50 98 8 15 s. 118 42 19 h.s. 122 31 16 h.s. 175 3 50 220 22 27 286 25 52 h.s. 58 48 11 97 2 12 175 36 51 275 5 45 315 16 21 h.s. 34 6 9 122 41 9 130 2 28 133 50 24 221 13 22	56 93 100 90 91 9 59 8 54 8 80 79 87 83 77 84 88 86 78 82 77 96 97 91 98 93 100 108 91 92 99 42 43 57 42 51 71 70 75 76 74		
KHAM, V Bagdharua, I Basoha, III Moraina Garda, VI KHARAKPUR, XIII Samenda, XV Chit Bisráam, XIV Kanaun, XII Gaura, XI KHEMPUR h.s. Mirgaráni Gora, XXXV* Bahrádel Hill Mark (Heliotrope) Pipardar Bagdharua, I Kona Temple No. 2 Kona Temple No. 1 Kona Building Kandwa	h.s. 4 48 58.88 113 7 40.70 145 39 8 187 22 57.13 178 42 10.30 246 49 5.65 307 45 52.92 356 20 21.70 h.s. 9 12 19 12 47 35 37 43 51 h.s. 136 58 0 231 34 52 245 3 28 254 40 28 261 20 28 h.s. 342 2 55	MAHESARI h.s. Bhubooah Temple No. 1 Paharia Rangarh Siwála Garda, VI Mahesari Chainpur Bhubooah Temple No. 1 Bhubooah Temple No. 2 PPARDAR h.s. Gidwas Hill Mark Bijagarh Magarda Bagdharua, I Kothádei Platform Bajnath Hill Mark Khempur Sewádhí, XXXVIII* Gora, XXXV*	72 69 70 69 73 74 49 48 42 33 52 50 34 32 32				

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † Of the North-East Longitudinal Series.

GORA MERIDIONAL SERIES.

CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— λ stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically, H_s for the Height when found by spirit leveling, and h for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of λ and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c., secondary stations by the letters h.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated. For alterations of district and other boundaries and consequent transfer of stations from one district to another since date of survey, see Addendum following page 8—0.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Ahraura Temple. (<i>Mirzapur</i>)</p> <p>λ 25 1 19.4 L 83 4 19.0 No. 98</p> <p>Azamgarh Church, (<i>Azamgarh</i>) N.E. Spire.</p> <p>λ 26 3 3.3 L 83 13 21.4</p> <p>Azamgarh Temple. (<i>Azamgarh</i>) On Siwála Ghat.</p> <p>λ 26 3 57.5 L 83 13 52.0</p> <p>Bagdharua, I. (<i>Mirzapur</i>. Vide page 3—0.)</p> <p>λ 24 32 49.67 L 83 32 13.14 H 2108 h 16 No. 1</p>	<p>Bahrádol Hill Mark (Heliotrope). (<i>Mirzapur</i>) On bank of Dol nadi about 3 miles W. of Dadhi and 2 miles E. of Bahrádol village.</p> <p>λ 24 16 27.19 L 83 14 18.75 Nos. 38, 39</p> <p>Baijnáth Hill Mark. (<i>Mirzapur</i>) On platform, about 2 miles S.E. of village so called and the same distance N.E. of Tharia village.</p> <p>λ 24 31 27.05 L 83 20 22.69 Nos. 50, 51</p> <p>Bajaur Hill Mark. (<i>Mirzapur</i>) About 4 miles N.E. of Chokahra village.</p> <p>λ 24 56 30.67 L 82 58 8.77</p> <p>Bakta House. (<i>Basti</i>) Flag on Gosáin's house on the Rapti river.</p> <p>λ 26 45 32.6 L 83 16 34.3</p>	<p>Balariáganj, XVII. (<i>Azamgarh</i>. Vide page 6—0.)</p> <p>λ 26 12 0.37 L 83 16 23.13 H_s 259.50* h 33 No. 19</p> <p>Balhui h.s. (<i>Mirzapur</i>) On the highest part of a hill about $3\frac{1}{4}$ miles W. of the large village of Ilia and $\frac{1}{4}$ mile N.E. of the small village of Mankapra; pargana Kera Mangraur.</p> <p>λ 25 3 2.24 L 83 19 51.91 No. 79</p> <p>Baniápár, XVIII. (<i>Azamgarh</i>. Vide page 6—0.)</p> <p>λ 26 15 7.72 L 83 25 29.46 H_s 244.07* h 25 No. 20</p>

* These heights refer to the mark-stone let into the ground floor of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Báukot Temple. (Azamgarh)</p> <p>λ 26 7 34.1 L 83 16 55.1</p> <p>Barhaj Temple. (Gorakhpur) On left bank of the Gogra river.</p> <p>λ 26 16 28.6 L 83 46 13.4</p> <p>Barhalganj Temple No. 1, (Gorakhpur) Highest.</p> <p>λ 26 16 47.2 L 83 33 18.7</p> <p>Barhalganj Temple No. 2. (Gorakhpur)</p> <p>λ 26 16 49.0 L 83 32 49.2</p> <p>Barhalganj Temple No. 3. (Gorakhpur)</p> <p>λ 26 16 48.3 L 83 32 52.3</p> <p>Barhalganj Temple No. 4. (Gorakhpur)</p> <p>λ 26 16 48.4 L 83 32 52.6</p> <p>Barhalganj Temple No. 5. (Gorakhpur)</p> <p>λ 26 16 48.6 L 83 32 51.2</p> <p>Barhalganj Temple No. 6. (Gorakhpur)</p> <p>λ 26 16 49.6 L 83 32 57.8</p> <p>Barháni, VIII. (Benares. Vide page 4—0.)</p> <p>λ 25 17 49.56 L 83 27 21.90 H_s 275.07* h 27 Nos. 7, 10</p> <p>Barhanpur, X. (Ghazipur. Vide page 5—0.)</p> <p>λ 25 32 6.83 L 83 26 28.87 H_s 256.58† h 22 No. 12</p>	<p>Barhiáchak, XIX. (Gorakhpur. Vide page 6—0.)</p> <p>λ 26 21 1.50 L 83 15 53.77 H 273 h 28 No. 21</p> <p>Basoha, III. (Mirzapur. Vide page 4—0.)</p> <p>λ 24 52 59.91 L 83 19 1.67 H 1256 h Not forthcoming No. 3</p> <p>Basoha h.s. (Mirzapur) On a knoll appertaining to the Bindhachal range, and N.N.W. of Basoha principal station from which it is separated by a branch of the Matani stream; pargana Kera Mangraur. A platform marks the station.</p> <p>λ 24 54 58.5 L 83 17 34.8 Nos. 64, 65</p> <p>Benares, Bisheshwar Temple, (Benares) N. Spire.</p> <p>λ 25 18 39.2 L 83 3 12.2</p> <p>Benares, Mán Mandir. (Benares) The Hindu Observatory.</p> <p>λ 25 18 24.9 L 83 3 13.3</p> <p>Benares Masjid. (Benares) Dome of Gyánbápi Masjid.</p> <p>λ 25 18 38.0 L 83 3 12.4</p> <p>Benares Mosque, (Benares) Minaret, E. pillar.</p> <p>λ 25 18 54.1 L 83 3 38.3 No. 111</p> <p>Benares, Rájghat s. (Benares) On building in old fort.</p> <p>λ 25 19 35.59 L 83 4 39.99</p> <p>Benares, Sikraul Observatory. (Benares)</p> <p>λ 25 20 1.8 L 83 1 43.9</p>	<p>Benares, Siwála Ghat. (Benares)</p> <p>λ 25 17 40.5 L 83 3 0.3</p> <p>Benares, Tulsi Dás's Ghat. (Benares)</p> <p>λ 25 17 22.0 L 83 2 57.5</p> <p>Benares, Turret, (Benares) High, in city.</p> <p>λ 25 18 31.3 L 83 3 4.5</p> <p>Bhadir, XVI. (Azamgarh. Vide page 6—0.)</p> <p>λ 26 5 19.87 L 83 26 25.82 H 283 h 33 No. 18</p> <p>Bhaurai Building. (Mirzapur) White square building in village.</p> <p>λ 25 6 15.4 L 82 52 7.5</p> <p>Bheri h.s. (Mirzapur) About a mile S. of Kanwahi and 1½ miles S.E. of Marfa village. A platform marks the station.</p> <p>λ 25 3 41.77 L 82 52 43.95 Nos. 93, 94</p> <p>Bhisia, XXI. (Gorakhpur. Vide page 6—0.)</p> <p>λ 26 28 57.29 L 83 12 27.30 H 283 h 23 No. 23</p> <p>Bhoili h.s. (Mirzapur) On the highest point of the hill which has the village of that name at its foot and the Semaphore on its shoulder; pargana Bhoili. A platform denotes the site of observation.</p> <p>λ 25 6 1.55 L 83 5 28.25 No. 90</p> <p>Bhoili Mosque, (Mirzapur) White, on S. face of a small hill, about 200 yards N. of village.</p> <p>λ 25 6 14.3 L 83 5 44.4</p>

* This height refers to the mark-stone let into the upper surface of the pillar. † This height refers to the mark-stone let into the ground floor of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Bhoili Semaphore. (<i>Mirzapur</i>)</p> <p>° ' "</p> <p>λ 25 6 9.6 L 83 5 34.7 No. 107</p> <p>Bhubooah Temple No. 1. (<i>Shahabad</i>)</p> <p>λ 25 1 24.4 L 83 38 58.4 No. 73</p> <p>Bhubooah Temple No. 2. (<i>Shahabad</i>)</p> <p>λ 25 2 13.8 L 83 39 34.5 No. 74</p> <p>Bijaigarh h.s. (<i>Mirzapur</i>) On building in fort.</p> <p>λ 24 34 29.59 L 83 13 30.11 Nos. 43, 44</p> <p>Biktamb Hill Stone. (<i>Gya</i>)</p> <p>λ 24 14 9.8 L 83 48 7.3</p> <p>See Synoptical Vol. of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Bisheshwarpur Factory, (<i>Mirzapur</i>) Godown.</p> <p>λ 25 12 33 L 83 3 39</p> <p>Budhāsali h.s. (<i>Shahabad</i>) On a swell of ground about 1½ miles S. of Khām principal station; pargana Chainpur. A small heap of stones marks the station.</p> <p>λ 24 45 51.86 L 83 33 9.56</p> <p>Chainpur h.s. (<i>Shahabad</i>) On a hill about 1 mile S.W. of the town of that name; pargana Chainpur.</p> <p>λ 25 1 49.86 L 83 31 34.68 Nos. 67, 68</p> <p>Chainpur Indigo Factory. (<i>Shahabad</i>) Chimney of bungalow.</p> <p>λ 25 1 37.6 L 83 32 5.0</p> <p>Chainpur Masjid, (<i>Shahabad</i>) Small, near S.W. limit of village.</p> <p>λ 25 2 15.7 L 83 32 10.1 No. 75</p>	<p>Chainpur Mausoleum, (<i>Shahabad</i>) Old high, top of dome.</p> <p>° ' "</p> <p>λ 25 1 49.5 L 83 31 52.8</p> <p>Chainpur Siwāla, (<i>Shahabad</i>) Small and Elegant, W. of Chainpur village.</p> <p>λ 25 2 17.3 L 83 32 40.4 No. 76</p> <p>Chakia Bungalow. (<i>Mirzapur</i>) Rāja's bungalow.</p> <p>λ 25 2 45.4 L 83 15 54.5</p> <p>Chakia Hill, (<i>Mirzapur</i>) Small.</p> <p>λ 25 2 34.6 L 83 16 4.8</p> <p>Chakia Siwāla, (<i>Mirzapur</i>) High, W. of tank.</p> <p>λ 25 2 44.3 L 83 15 43.1</p> <p>Chikda Temple. (<i>Mirzapur</i>) On ghat.</p> <p>λ 25 12 19.8 L 83 3 8.6</p> <p>Chit Bistrām, XIV. (<i>Azamgarh</i>. <i>Vide page 5—o.</i>)</p> <p>λ 25 54 2.82 L 83 26 18.58 Hs 251.29* h 23 No. 16</p> <p>Chunar Church, (<i>Mirzapur</i>) Tower, in Cantonment.</p> <p>λ 25 7 50.5 L 82 55 46.3 No. 108</p> <p>Chunar Fort, (<i>Mirzapur</i>) Flagstaff.</p> <p>λ 25 7 30.0 L 82 55 1.6 Nos. 102, 103</p> <p>Chunar Fort s. (<i>Mirzapur</i>) On building called the <i>Baramahal</i> in centre of Barracks.</p> <p>λ 25 7 19.10 L 82 55 9.99 Nos. 100, 101</p>	<p>Chunar Monument, (<i>Mirzapur</i>) Highest, in burial ground at foot of the fort.</p> <p>° ' "</p> <p>λ 25 7 18.1 L 82 55 3.0</p> <p>Chunar Semaphore. (<i>Mirzapur</i>)</p> <p>λ 25 7 16.2 L 82 55 9.2</p> <p>Chunar Temple. (<i>Mirzapur</i>) Near ferry-ghat.</p> <p>λ 25 7 36.6 L 82 55 17.2</p> <p>Chunar, Tikor Dargah. (<i>Mirzapur</i>) In karbala.</p> <p>λ 25 6 54.9 L 82 54 43.8</p> <p>Chunar, Tikor House. (<i>Mirzapur</i>) Staircase of Mr. DeGruyther's house.</p> <p>λ 25 7 3.7 L 82 54 51.9</p> <p>Chunar, Tikor Temple. (<i>Mirzapur</i>) On bank of the Ganges.</p> <p>λ 25 7 8.9 L 82 54 56.6</p> <p>Danwār Hill Mark. (<i>Garhjat States, Chota Nagpore Division</i>) In Singūju.</p> <p>λ 23 57 33.50 L 83 30 9.24</p> <p>See Synoptical Vol. of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Darhana Building, (<i>Mirzapur</i>) White and black.</p> <p>λ 25 1 31.1 L 83 7 38.2 No. 99</p> <p>Deheri Siwāla. (<i>Mirzapur</i>) In village.</p> <p>λ 25 4 8.6 L 83 22 19.1 No. 84</p> <p>Deobal h.s. (<i>Mirzapur</i>) On a hill about 1 mile S.E. of Chakia, a large village and country seat of the Rāja of Benares; pargana Kera Mangraur.</p> <p>λ 25 1 55.44 L 83 16 15.19 Nos. 80, 81</p>

* This height refers to the mark-stone let into the ground floor of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Deokali, XXIII. (Gorakhpur. Vide page 7—0.)</p> <p>λ 26° 37' 54" II L 83 8 25.98 H 293 h 23 No. 25</p> <p>Deopura h.s. (Mirzapur) About 4 miles S.W. of Rāmpur village. λ 24 56 27.54 L 82 49 25.89 See Synoptical Vol. of the Gurwāni Meridional Series.</p> <p>Deori Fort s. (Azamgarh) λ 26 16 28.21 L 83 33 0.76</p> <p>Deori Ghat s. (Azamgarh) At Indigo Factory bungalow. λ 26 16 20.51 L 83 33 35.30</p> <p>Deori Masjid, N. Minaret. (Azamgarh) λ 26 16 28.2 L 83 33 3.7</p> <p>Deori Masjid, S. Cupola. (Azamgarh) λ 26 16 28.1 L 83 33 3.6</p> <p>Deori Masjid, S. Minaret. (Azamgarh) λ 26 16 29.7 L 83 33 10.8</p> <p>Deori Temple No. 1. (Azamgarh) λ 26 16 28.4 L 83 33 7.0</p> <p>Deori Temple No. 2. (Azamgarh) λ 26 16 29.6 L 83 33 11.2</p> <p>Dharamsingua, LVI.* (Gorakhpur. Vide page 7—0.) λ 27 4 50.15 L 83 6 33.09 H 309 h 25 No. 31</p>	<p>Dharua Temple No. 1. (Ghazipur) In plain E. of village. λ 25° 32' 41" 0 L 83 27 49.2</p> <p>Dharua Temple No. 2. (Ghazipur) On road side. λ 25 32 44.1 L 83 27 34.0</p> <p>Dhaurāra Siwāla. (Mirzapur) In village. λ 25 6 38.5 L 82 52 52.7</p> <p>Dibar Hill Mark. (Mirzapur) About 1½ miles N. of Khadra and 2 miles N.E. of Purwa Ganpat. A platform marks the station. λ 24 38 24.00 L 82 55 11.17 No. 56</p> <p>Gadāpahāri Building. (Mirzapur) Small stone building on hill. λ 25 6 49.8 L 82 54 57.1</p> <p>Ganges River No. 1 s. (Mirzapur) On N. bank, ½ a mile E. of Silpi. λ 25 7 2.87 L 82 53 13.77</p> <p>Ganges River No. 2 s. (Mirzapur) On S. bank about 350 yards W. of Tamālganj. λ 25 6 36.56 L 82 53 44.36</p> <p>Ganges River No. 3 s. (Mirzapur) On N. bank, ½ of a mile S.E. of Mowai. λ 25 7 22.65 L 82 54 8.74</p> <p>Ganges River No. 4 s. (Mirzapur) On N. bank, ½ a mile S.E. of Misirpura village. λ 25 7 35.66 L 82 54 35.97</p> <p>Ganges River No. 5 s. (Mirzapur) On N. bank above the ferry-ghat and about 20 yards N. of the road from Chunar to Benares. λ 25 7 56.11 L 82 54 50.04</p>	<p>Ganges River No. 6 s. (Mirzapur) On right bank, on a square stone platform near the northern limits of the Chunar parade ground. λ 25 8 14.77 L 82 55 46.17</p> <p>Ganges River No. 7 s. (Mirzapur) On N. high bank near the village of Chamrauli. λ 25 8 50.22 L 82 55 12.55</p> <p>Ganges River No. 8 s. (Mirzapur) On E. bank, in the Khādar lands formed by the river. λ 25 8 41.75 L 82 56 8.25</p> <p>Ganges River No. 9 s. (Mirzapur) On W. bank, 1 mile S. of the station of Sultānpur. λ 25 9 57.77 L 82 55 31.39</p> <p>Ganges River No. 10 s. (Mirzapur) In the alluvial land on E. bank opposite to Sultānpur. λ 25 10 29.66 L 82 56 42.83</p> <p>Ganges River No. 11 s. (Mirzapur) On W. bank, within the compound of a bungalow belonging to Mr. DeGruyther. λ 25 10 54.87 L 82 56 12.64</p> <p>Ganges River No. 12 s. (Mirzapur) On E. bank, in the Khādar lands formed by the river. λ 25 11 4.22 L 82 56 50.03</p> <p>Ganges River No. 13 s. (Mirzapur) On high W. bank, ½ a mile E. of the Sultānpur burial ground. λ 25 11 42.05 L 82 56 33.18</p>

* Of the North-East Longitudinal Series.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Ganges River No. 14 s. (Mirzapur) On E. bank, in the Khádar lands about ½ a mile W. of Saipur village. λ 25 11 28.35 L 82 57 8.38	Ganges River No. 24 s. (Benares) On left bank. λ 25 12 38.31 L 82 58 59.34	Ganges River No. 35 s. (Benares) On left bank. λ 25 13 0.42 L 83 2 17.86
Ganges River No. 15 s. (Mirzapur) On high W. bank. λ 25 11 58.11 L 82 56 52.67	Ganges River No. 25 s. (Mirzapur) On right bank. λ 25 12 15.84 L 83 0 0.68	Ganges River No. 36 s. (Mirzapur) On right bank. λ 25 12 13.62 L 83 2 55.60
Ganges River No. 16 s. (Mirzapur) On E. bank, in the Khádar lands form- ed by the river. λ 25 11 41.00 L 82 57 21.27	Ganges River No. 26 s. (Benares) On left bank. λ 25 12 41.47 L 82 59 51.70	Ganges River No. 37 s. (Mirzapur) On right bank. λ 25 12 59.12 L 83 3 46.51
Ganges River No. 17 s. (Mirzapur) On W. bank. λ 25 12 8.34 L 82 57 13.50	Ganges River No. 27 s. (Benares) On left bank. λ 25 12 42.27 L 83 0 16.87	Ganges River No. 38 s. (Benares) On left bank. λ 25 13 12.46 L 83 2 52.67
Ganges River No. 18 s. (Mirzapur) On right bank. λ 25 12 1.36 L 82 57 59.33	Ganges River No. 28 s. (Mirzapur) On right bank. λ 25 12 15.95 L 83 0 25.48	Ganges River No. 39 s. (Benares) On left bank. λ 25 13 50.79 L 83 3 24.99
Ganges River No. 19 s. (Mirzapur) On left bank. λ 25 12 18.38 L 82 57 37.62	Ganges River No. 29 s. (Benares) On left bank. λ 25 12 41.58 L 83 0 33.40	Ganges River No. 40 s. (Mirzapur) On right bank. λ 25 13 26.40 L 83 4 6.54
Ganges River No. 20 s. (Mirzapur) On left bank. λ 25 12 28.20 L 82 58 18.18	Ganges River No. 30 s. (Mirzapur) On right bank. λ 25 12 16.02 L 83 0 52.62	Ganges River No. 41 s. (Benares) On left bank. λ 25 14 7.42 L 83 3 33.68
Ganges River No. 21 s. (Mirzapur) On right bank. λ 25 12 10.53 L 82 58 32.26	Ganges River No. 31 s. (Benares) On left bank. λ 25 12 46.77 L 83 0 50.35	Ganges River No. 42 s. (Mirzapur) Also called Chota Mirzapur, on right bank. λ 25 14 13.59 L 83 4 30.79
Ganges River No. 22 s. (Mirzapur) On left bank. λ 25 12 34.69 L 82 58 40.96	Ganges River No. 32 s. (Mirzapur) On right bank. λ 25 12 14.10 L 83 1 25.55	Ganges River No. 43 s. (Benares) On left bank. λ 25 14 42.42 L 83 3 58.74
Ganges River No. 23 s. (Mirzapur) On right bank. λ 25 12 14.66 L 82 59 9.81	Ganges River No. 33 s. (Benares) On left bank. λ 25 12 48.88 L 83 1 40.78	Ganges River No. 44 s. (Benares) On right bank. λ 25 15 24.21 L 83 4 20.22
	Ganges River No. 34 s. (Mirzapur) On right bank. λ 25 12 12.95 L 83 2 3.44	Ganges River No. 45 s. (Benares) On left bank. λ 25 15 4.31 L 83 3 35.34

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Ganges River No. 46 s. (Benares) On left bank. λ 25 15 47.90 L 83 3 18.25	Ganges River No. 56 s. (Ghazipur) On right bank. λ 25 35 6.46 L 83 42 8.36	Ganges River No. 67 s. (Ghazipur) On right bank. λ 25 32 6.64 L 83 48 1.14
Ganges River No. 47 s. (Benares) On left bank. λ 25 16 47.44 L 83 2 56.17	Ganges River No. 57 s. (Ghazipur) On left bank. λ 25 36 9.02 L 83 42 50.69	Ganges River No. 68† s. (Ghazipur) On left bank. λ 25 32 54.49 L 83 49 30.57
Ganges River No. 48 s. (Benares) On left bank. λ 25 17 3.92 L 83 3 0.44	Ganges River No. 58 s. (Ghazipur) On right bank. λ 25 34 55.42 L 83 43 18.13	Ganges River No. 69† s. (Ghazipur) On right bank. λ 25 31 30.95 L 83 49 47.61
Ganges River No. 49 s. (Benares) On right bank. λ 25 17 37.13 L 83 3 57.60	Ganges River No. 59 s. (Ghazipur) On left bank. λ 25 36 10.17 L 83 43 53.76	Garda, VI. (Shahabad. Vide page 4—o.) λ 24 50 54.86 L 83 34 54.96 H 1065 h 1 No. 5
Ganges River No. 50* s. (Benares) On right bank. λ 25 17 57.21 L 83 4 20.00	Ganges River No. 60 s. (Ghazipur) On right bank. λ 25 34 44.83 L 83 43 41.57	Gaura, XI. (Ghazipur. Vide page 5—o.) λ 25 37 59.15 L 83 17 4.76 H 289 h 20 No. 13
Ganges River No. 51* s. (Benares) On right bank. λ 25 18 40.58 L 83 4 50.54	Ganges River No. 61 s. (Ghazipur) On left bank. λ 25 35 59.39 L 83 45 31.74	Gharbaria, LVIII†. (Gorakhpur. Vide page 8—o.) λ 27 2 52.80 L 83 17 32.64 H 279.605 h 25 No. 30
Ganges River No. 52* s. (Ghazipur) On right bank. λ 25 34 11.16 L 83 38 5.52	Ganges River No. 62 s. (Ghazipur) On right bank. λ 25 34 16.11 L 83 44 34.29	Ghauspur Dome. (Ghazipur) λ 25 36 44.6 L 83 44 28.1
Ganges River No. 53* s. (Ghazipur) On right bank. λ 25 34 51.64 L 83 39 32.15	Ganges River No. 63 s. (Ghazipur) On right bank. λ 25 33 38.78 L 83 45 30.38	Ghazipur Chapel. (Ghazipur) Belfry of Roman Catholic Chapel. λ 25 33 43.0 L 83 35 21.0
Ganges River No. 54 s. (Ghazipur) On right bank. λ 25 35 0.56 L 83 40 39.61	Ganges River No. 64 s. (Ghazipur) On left bank. λ 25 34 0.66 L 83 46 42.54	Ghazipur Church Steeple. (Ghazipur) In Cantonment. λ 25 33 36.46 L 83 35 14.25
Ganges River No. 55 s. (Ghazipur) On left bank. λ 25 36 0.58 L 83 41 28.29	Ganges River No. 65 s. (Ghazipur) On right bank. λ 25 32 40.05 L 83 46 52.08	
	Ganges River No. 66 s. (Ghazipur) On left bank. λ 25 33 23.71 L 83 48 3.44	

* Two portions of the River Ganges were spanned by the Secondary Series here given, of which one lies to the west and the other to the east of the Principal Triangulation; the two series are not continuous, the western terminates at stations 50 and 51, the eastern begins at 52 and 53. † The continuation of this triangulation will be found in the Co-ordinate List of the Hurlong Meridional Series. ‡ Of the North-East Longitudinal Series. § This height refers to the mark-stone let into the ground floor of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Ghazipur City No. 1 s. (Ghazipur) On Nawáb Hikmat Ali Khán's Chahal-sutún. λ 25 35 1°51' L 83 38 24°34'	Ghazipur New Burial Ground, (Ghazipur) Highest tomb. λ 25 33 6°9' L 83 34 33°0'	Gogra River No. 60 s. (Gorakhpur) On left bank, 0·8 of a mile W. of the large village of Pannah. λ 26 15 14°53' L 83 48 50°66'
Ghazipur City No. 2 s. (Ghazipur) On Chahalsutún gateway, Nawáb's Sarai. λ 25 35 6°02' L 83 38 20°74'	Ghazipur Old Burial Ground. (Ghazipur) λ 25 34 45' L 83 35 2'	Gogra River No. 61 s. (Azamgarh) On right bank, about 0·1 of a mile N.E. of Harnhi Tola and the same distance N.W. of Mallah Tola. λ 26 13 44°46' L 83 46 12°40'
Ghazipur Fort. (Ghazipur) Shiv Nārāyan Rái's house in old fort. λ 25 34 48°9' L 83 38 5°0'	Ghazipur Permit Office, (Ghazipur) Chimney. λ 25 35 20°1' L 83 38 51°9'	Gogra River No. 62 s. (Gorakhpur) On left bank, on a high mound near the large village of Barhāj and close to the high road to Gorakhpur. λ 26 16 19°05' L 83 46 17°26'
Ghazipur Hospital, (Ghazipur) Medical servants' quarters. λ 25 32 50°4' L 83 34 55°8'	Ghazipur Temple No. 1. (Ghazipur) Thākurdwāra temple. λ 25 34 32°6' L 83 36 59°3'	Gogra River No. 63 s. (Azamgarh) On right bank, 0·3 of a mile W. of Dharampur, 0·4 of a mile N. of Siswah and 0·7 of a mile N.E. of Bhansiawn. λ 26 13 44°71' L 83 43 5°18'
Ghazipur House No. 1. (Ghazipur) Mr. Bruce's factory house. λ 25 35 30°8' L 83 39 11°3'	Ghazipur Temple No. 2. (Ghazipur) Sheodayál Missar's temple. λ 25 34 54°2' L 83 37 39°8'	Gogra River No. 64 s. (Gorakhpur) On left bank, S.E. of and close to Rájpur and near the junction of the Rápti and Gogra rivers. λ 26 16 28°26' L 83 43 20°75'
Ghazipur House No. 2. (Ghazipur) Opium agent's house, signal staff. λ 25 34 25°8' L 83 37 10°4'	Ghazipur Temple No. 3. (Ghazipur) On Khirki Ghat. λ 25 35 0°0' L 83 38 19°1'	Gogra River No. 64a s. (Gorakhpur) At junction of the Gogra and Rápti rivers. λ 26 16 13°94' L 83 43 33°06'
Ghazipur Indigo Factory. (Ghazipur) Chimney of Mr. Bruce's factory in Gosáindáspur. λ 25 35 35°7' L 83 39 8°2'	Ghazipur Temple No. 4. (Ghazipur) Mughalpura temple. λ 25 35 5°8' L 83 38 30°1'	Gogra River No. 65 s. (Gorakhpur) On left bank, near the high road to Gorakhpur, 0·2 of a mile W. of Gunghat, 0·7 of a mile S. of Khairanti and 1 mile E. of Bhundadi. λ 26 16 11°27' L 83 40 41°80'
Ghazipur, Jamalpur Rauza. (Ghazipur) λ 25 35 33°8' L 83 38 21°5'	Ghazipur Temple No. 5. (Ghazipur) Mádhó Dás's temple. λ 25 35 5°8' L 83 38 30°2'	Gogra River No. 66 s. (Azamgarh) On right bank, 0·5 of a mile N.W. of Semara and 0·5 of a mile E. of Súrājpura fort. λ 26 13 52°04' L 83 39 27°73'
Ghazipur Masjid No. 1. (Ghazipur) Mausā-alam-ka-Masjid. λ 25 34 36°9' L 83 37 30°1'	Ghazipur Temple No. 6. (Ghazipur) Kháki Gosáin's temple. λ 25 35 23°7' L 83 39 2°1'	Gogra River No. 67 s. (Gorakhpur) On left bank, 0·5 of a mile S. of Dehra. λ 26 16 45°92' L 83 38 25°02'
Ghazipur Masjid No. 2. (Ghazipur) In Nawábganj. λ 25 35 21°7' L 83 38 22°0'	Gidwas Hill Mark. (Mirzapur) On platform, about 2 miles N.E. of Bandhaura village and 2½ miles N.W. of Panki Purwa. λ 24 30 39°26' L 83 11 24°25' No. 49	
Ghazipur Monument. (Ghazipur) Spire of dome of Lord Cornwallis's Monument. λ 25 33 30°7' L 83 35 19°7'	Gogra River No. 59* s. (Azamgarh) On right bank, near a Sota on an island and surrounded by Jhau jungle. λ 26 12 57°76' L 83 49 17°96'	

* The preceding portion of this triangulation will be found in the Co-ordinate List of the Hurláong Meridional Series and the continuation in that of the Gurwáni Meridional Series.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Gogra River No. 68 s. (Azamgarh) On right bank, 0.3 of a mile N. of Belwati and 0.6 of a mile E. of Gauridi. λ 26 14 7.91 L 83 36 36.05	Gogra River No. 78 s. (Azamgarh) On right bank, 0.4 of a mile N. of Barāmadpur and 1 mile E. of Sahabādia. λ 26 15 10.33 L 83 28 16.63	Gogra River No. 88 s. (Azamgarh) On right bank, 0.2 of a mile S.W. of Dangardhia and 0.3 of a mile N.W. of Nawa Tola. λ 26 17 33.85 L 83 14 49.11
Gogra River No. 69 s. (Gorakhpur) On left bank, 0.2 of a mile W. of Kunda Tola. λ 26 17 9.73 L 83 36 21.74	Gogra River No. 79 s. (Gorakhpur) On Madraha fort on left bank. λ 26 17 25.50 L 83 27 11.38	Gogra River No. 89 s. (Gorakhpur) On left bank, 0.7 of a mile S. of Shio- pur Tola and 1.3 miles S.W. of Bfbipur. λ 26 19 21.42 L 83 13 25.12
Gogra River No. 70 s. (Azamgarh) On right bank, 0.1 of a mile W. of Sarai village. λ 26 16 8.18 L 83 34 30.80	Gogra River No. 80 s. (Azamgarh) On right bank, 0.6 of a mile N. of Kunrohwa and 0.6 of a mile E. of Bariarganj. λ 26 16 59.06 L 83 25 16.51	Gogra River No. 90 s. (Azamgarh) On right bank, 0.2 of a mile N. of Patkauli and 0.7 of a mile E. of Tiprajpur. λ 26 16 4.30 L 83 11 52.33
Gogra River No. 71 s. (Gorakhpur) On left bank, on a mud fort in Nar- harpur village. λ 26 16 42.67 L 83 33 57.86	Gogra River No. 81 s. (Gorakhpur) On left bank at its junction with the Konna nadi, 0.2 of a mile W. of Marha and about the same distance from Shiopur. λ 26 19 22.19 L 83 25 8.67	Gogra River No. 91 s. (Gorakhpur) On left bank, 0.6 of a mile S.W. of Hukia and 0.7 of a mile S. of Hukia village. λ 26 19 5.60 L 83 11 55.46
Gogra River No. 72 s. (Azamgarh) On right bank, 0.5 of a mile S.E. of Deori and 0.25 of a mile N.E. of Bhurabar Tola. λ 26 15 57.71 L 83 33 30.72	Gogra River No. 82 s. (Azamgarh) On right bank, 0.6 of a mile W. of Hajipur, 0.2 of a mile N.E. of Bhadaura and 0.75 of a mile E. of Bānka. λ 26 17 30.54 L 83 22 56.30	Gogra River No. 92 s. (Azamgarh) On right bank, 0.2 of a mile W. of Nahrampur and 1.2 miles S.E. of Bankatwa. λ 26 17 32.06 L 83 9 50.15
Gogra River No. 73 s. (Gorakhpur) On left bank, on a paka house near the Ghat in the large village of Barhulganj. λ 26 16 49.18 L 83 33 2.41	Gogra River No. 83 s. (Gorakhpur) On left bank, 1.3 miles S.W. of Sri- nagar and 1.4 miles S.E. of Bhiropur. λ 26 19 35.39 L 83 22 45.79	Gogra River No. 93 s. (Fyzabad) On right bank, 0.6 of a mile N.E. of Bhadaina. λ 26 19 46.72 L 83 8 59.54
Gogra River No. 74 s. (Azamgarh) On right bank, 0.5 of a mile N.W. of Dhanauti village. λ 26 15 53.71 L 83 32 32.06	Gogra River No. 84 s. (Azamgarh) On right bank, 1.4 miles N. of Rauna- pār and 1 mile N.E. of Mansāganj. λ 26 18 14.99 L 83 19 38.40	Gogra River No. 94 s. (Gorakhpur) On left bank, 0.2 of a mile S. of Pande Sisawa and 0.6 of a mile S.W. of Rāmdīāl Sisawa. λ 26 21 36.29 L 83 11 34.25
Gogra River No. 75 s. (Gorakhpur) On left bank, 0.6 of a mile W. of Jaipār village and 0.2 of a mile S.W. of a paka building (Devi's Sthān). The road to Gorakhpur passes close N. of the station. λ 26 16 54.69 L 83 31 28.12	Gogra River No. 85 s. (Gorakhpur) On left bank, 0.4 of a mile S. of Shio- pur and 0.2 of a mile S.E. of Dewal Pande's Tola. λ 26 19 59.91 L 83 20 33.54	Gogra River No. 95 s. (Fyzabad) On right bank, 1.4 miles E. of Kaithia and 1.5 miles S.E. of Gamaria paka building (Sati). λ 26 22 40.02 L 83 7 56.31
Gogra River No. 76 s. (Azamgarh) On right bank, 0.2 of a mile N.W. of Nauli village. λ 26 15 22.78 L 83 30 45.19	Gogra River No. 86 s. (Gorakhpur) On left bank, 1 mile S. of Kaliānpur and 0.4 of a mile S.W. of Urdiha Tola. λ 26 20 0.88 L 83 18 12.54	Gogra River No. 95 ₁ s. (Fyzabad) On right bank, 0.6 of a mile N.E. of Raimanpur and 0.4 of a mile E. of Pīkar. λ 26 22 12.72 L 83 7 42.78
Gogra River No. 77 s. (Gorakhpur) On left bank, 0.4 of a mile N.E. of Dalua and 0.6 of a mile S. of Nawāda. λ 26 16 45.38 L 83 28 59.60	Gogra River No. 87 s. (Azamgarh) On right bank, 0.8 of a mile N. W. of Guriana Tola and 0.4 of a mile S.W. of Khar-Khaia. λ 26 18 5.18 L 83 17 11.24	Gogra River No. 96 s. (Gorakhpur) On left bank, 0.1 of a mile W. of Tennai and 0.5 of a mile S. of Khairanti on the road to Belwa. λ 26 23 19.44 L 83 10 30.17

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Gogra River No. 97 s. (Gorakhpur) On left bank, 0.1 of a mile N.W. of Nurgara and 0.2 of a mile S.W. of Tikapur.	Gogra River No. 107 s. (Fyzabad) On right bank, near Chahora Ghat.	Gorakhpur House No. 1. (Gorakhpur) Bábu Hari's house.
λ 26 24 48.45 L 83 8 55.10	λ 26 30 44.06 L 82 56 51.25	λ 26 45 3.9 L 83 23 28.6
Gogra River No. 98 s. (Fyzabad) On right bank, near Khamaria Ghat, 0.3 of a mile E. of Janpur.	Gogra River No. 108 s. (Basti) On left bank, 0.5 of a mile N.W. of Kalilapur, 0.2 of a mile E. of Surha and 1 mile S. of Udua.	Gorakhpur House No. 2. (Gorakhpur) Domingar Collector's house.
λ 26 23 59.54 L 83 6 59.95	λ 26 32 13.70 L 82 58 12.95	λ 26 45 37.4 L 83 22 6.9
Gogra River No. 99 s. (Basti) On left bank, 0.4 of a mile N. of Dholbája, 0.1 of a mile N.E. of Gaighat Tola and 0.4 of a mile W. of Kataha.	Gogra River No. 109 s. (Basti) On left bank, 1.3 miles W. of Gobindganj, 0.8 of a mile S. W. of Nakahi and 0.6 of a mile E. of Teghpur.	Gorakhpur Jail. (Gorakhpur) Upper ward.
λ 26 26 22.68 L 83 7 4.02	λ 26 33 7.88 L 82 56 20.76	λ 26 44 46 L 83 23 38
Gogra River No. 100 s. (Fyzabad) On right bank, on a fort belonging to the Talukdar of Chandipur.	Gogra River No. 110 s. (Fyzabad) On right bank, 0.3 of a mile N.W. of Maini village, on an old paka fort close to the water's edge.	Gorakhpur Mosque. (Gorakhpur) Near Rajghat.
λ 26 24 57.18 L 83 6 1.87	λ 26 32 35.21 L 82 53 54.83	λ 26 44 28.6 L 83 23 37.6
Gogra River No. 101 s. (Basti) On left bank, 0.3 of a mile N.W. of Tilah, 0.4 of a mile S. of Rampur and 0.7 of a mile N.E. of Daulatpur.	Gogra River No. 111 s. (Basti) On left bank, contiguous to the village of Dihupura, 0.3 of a mile W. of Ismailpur or Pareo and 0.5 of a mile S.W. of Chibra.	Gorakhpur Temple. (Gorakhpur) On Rajghat.
λ 26 28 10.38 L 83 5 50.89	λ 26 36 5.17 L 82 53 40.44	λ 26 44 10.2 L 83 23 45.4
Gogra River No. 102 s. (Fyzabad) On right bank close to the water's edge, and on the edge of a patch of thorny jungle.	Gogra River No. 112 s. (Fyzabad) On right bank, 0.3 of a mile N.E. of Tarauli.	Gosáindáspur Temple. (Ghazipur)
λ 26 27 37.40 L 83 3 40.04	λ 26 33 29.99 L 82 52 19.02	λ 25 35 9.1 L 83 38 36.5
Gogra River No. 103 s. (Basti) On left bank, 0.4 of a mile W. of Turkaulin, 1 mile S.W. of Unchágon and 0.6 of a mile S. of the Chapra Gurudwara.	Gogra River No. 113 s. (Basti) On left bank, 0.9 of a mile S. of Parmesrapur and 0.7 of a mile S.E. of Dhusua.	Hara Sida Hill Flag. (Lohardugga)
λ 26 29 28.51 L 83 3 20.45	λ 26 35 43.76 L 82 51 11.73	λ 23 56 11.2 L 83 42 2.8
Gogra River No. 104 s. (Fyzabad) On right bank, in a patch of thorny jungle and E. of Masuraha village.	Gogra River No. 114 s. (Fyzabad) On right bank, 0.1 of a mile N. of Lachipur, and 0.2 of a mile S.E. of Mathia.	See 'Hará Sida' of the Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.
λ 26 28 6.94 L 83 2 53.16	λ 26 33 39.20 L 82 50 49.20	Hirdepur, IX. (Benares. Vide page 5—o.)
Gogra River No. 105 s. (Fyzabad) On right bank, in Kasba Berar.	Gora, XXXV.* (Mirzapur. Vide page 3—o.)	λ 25 24 23.05 L 83 16 42.64 H, 288.88† h 32 No. 11
λ 26 29 12.11 L 83 0 27.71	λ 24 4 55.71 L 83 16 40.65 H 1828 h 3 No. 1	Ila Siwála, (Shahabad) Higher of two, in the middle of the village.
Gogra River No. 106 s. (Basti) On left bank, 0.6 of a mile N.W. of Gularia and 0.2 of a mile S.E. of Chapra.	Gorakhpur Building. (Gorakhpur) Gházi Mián-ka-Rauza.	λ 25 4 26.6 L 83 22 45.6 No. 86
λ 26 31 25.21 L 83 0 16.48	λ 26 45 20.4 L 83 22 53.0	Kanaun, XII. (Ghazipur. Vide page 5—o.)
		λ 25 43 3.62 L 83 26 18.56 H, 270.52‡ h 20 No. 14

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † This height refers to the upper surface of the tower. ‡ This height refers to the mark-stone let into the upper surface of the pillar.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Kandákot, II. <i>(Mirzapur. Vide page 3—0.)</i> λ 24 37 56.86 L 83 2 37.78 H 1446 h Not forthcoming No. 2	Kharakpur, XIII. <i>(Azamgarh. Vide page 5—0.)</i> λ 25 50 8.73 L 83 16 13.26 H 286 h 20 No. 15	Kotan Hill Stone. <i>(Lohardugga)</i> λ 24 6 2.2 L 83 44 34.0 See Synoptical Vol. of the Calcutta Longitudinal Series of the South-East Quadrilateral.
Kandwa h.s. <i>(Mirzapur)</i> About a mile S. of village so called and 2 miles N. of Diwi village. λ 24 17 26.72 L 83 24 25.80 Nos. 36, 37	Khás Bargawa Mark. <i>(Mirzapur)</i> λ 25 1 12.30 L 82 49 48.69	Kothádei Platform. <i>(Mirzapur)</i> On left bank of the Son river. λ 24 31 37.3 L 83 28 39.6 No. 52
Kariapahár Shikhar. <i>(Mirzapur)</i> About 2 miles N.E. of Budim village and $\frac{1}{4}$ miles W. of Dhusuria. λ 24 57 4 L 83 10 45	Khempur h.s. <i>(Mirzapur)</i> About $2\frac{1}{2}$ miles S. of village so called and 3 miles W. of Kon Khás village. λ 24 25 11.77 L 83 21 41.43 Nos. 34, 35	Kuba h.s. <i>(Mirzapur)</i> About $1\frac{1}{2}$ miles N. of Kuba Khurd (small) village. λ 25 2 20.26 L 82 51 9.34
Katailwa Temple. <i>(Gorakhpur)</i> λ 26 17 25.9 L 83 44 23.4	Khorádi, IV. <i>(Mirzapur. Vide page 4—0.)</i> λ 24 54 22.50 L 83 0 42.69 H 1037 h Not forthcoming No. 8	Kurtha Temple. <i>(Ghazipur)</i> On ghat. λ 25 32 43.9 L 83 34 48.5
Katesar Temple, <i>(Benares)</i> Half finished in 1846. λ 25 16 53.0 L 83 4 58.3	Kona Building. <i>(Mirzapur)</i> White building in village. λ 24 25 27.3 L 83 23 32.6 No. 46	Kusáhi Temple. <i>(Mirzapur)</i> λ 25 10 22.1 L 82 54 55.7 See Synoptical Vol. of the Gurwáni Meridional Series.
Kathaut Indigo Factory. <i>(Ghazipur)</i> W. corner of roof of bungalow. λ 25 36 31.6 L 83 43 36.9	Kona Temple No. 1. <i>(Mirzapur)</i> White temple at the northern extremity of village. λ 24 25 41.0 L 83 23 37.8 No. 47	Kusumi Temple. <i>(Ghazipur)</i> λ 25 33 18.3 L 83 29 41.5
Katwar, XXII. <i>(Gorakhpur. Vide page 6—0.)</i> λ 26 33 54.34 L 83 20 27.59 H_s 271.16* h 23 No. 24	Kona Temple No. 2. <i>(Mirzapur)</i> Old temple 500 yards N.W. of village. λ 24 25 53.7 L 83 23 19.9 No. 48	Larikákudan t.s. <i>(Benares)</i> λ 25 22 25.40 L 83 3 59.36
Kázipur Temple. <i>(Basti)</i> λ 26 45 14.9 L 83 10 46.7	Kota h.s. <i>(Shahabad)</i> On a hill about $1\frac{1}{2}$ miles S. of the large village of Ilia and $\frac{1}{4}$ mile S.W. of Málda, a small village; pargana Chainpur. λ 25 2 53.67 L 83 22 34.65 Nos. 77, 78	Latífgarh Fort, <i>(Mirzapur)</i> N.E. tower. λ 24 59 4.5 L 83 4 32.9 No. 97
Khám, V. <i>(Shahabad. Vide page 4—0.)</i> λ 24 47 20.99 L 83 33 33.40 H 1442 h Not forthcoming No. 4		Madráha Masjid, <i>(Basti)</i> N. minaret. λ 26 31 34.2 L 82 59 23.4
		Magan Diwána h.s. <i>(Mirzapur)</i> On an isolated hill about 1 mile N.E. of Ahraura; pargana Bhoili. A platform on the highest part of the hill, the top of which is nearly flat, denotes the site of observation. λ 25 1 59.82 L 83 5 51.18 Nos. 91, 92

* This height refers to the mark-stone let into the ground floor of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Magarda h.s. (Mirzapur) About 2 miles N.W. of Gudaun village.</p> <p>λ 24 34 2°01 L 83 17 34°93 No. 42</p> <p>Mahesari h.s. (Shahabad) On the highest part of a hill about 2½ miles S.W. of the large village of Bhubooah and ½ mile N.W. of Rāmgarh, a small village; pargana Chainpur.</p> <p>λ 24 58 58°98 L 83 36 27°14 Nos. 70, 71</p> <p>Málda House. (Mirzapur-Shahabad) In centre of village.</p> <p>λ 25 3 30°8 L 83 22 59°9 No. 82</p> <p>Mangesar Hill Mark. (Mirzapur) On platform, about 2 miles S. of Belach and 2½ miles W. of Markāndi.</p> <p>λ 24 31 44°19 L 83 6 52°67 Nos. 53, 54</p> <p>Milkípur Temple. (Benares) On ghat.</p> <p>λ 25 14 30°9 L 83 4 29°2</p> <p>Mirgarāni h.s. (Mirzapur) On the highest point of a hill about a mile N. of Gonda village and the same distance W. of Korlihi.</p> <p>λ 24 4 54°87 L 83 18 6°60 Nos. 40, 41</p> <p>Miria Temple, (Mirzapur) Spire.</p> <p>λ 25 7 52°4 L 82 54 39°7 No. 109</p> <p>Moraina h.s. (Shahabad) On a hill above Jamni Nar village. A platform marks the site of observation.</p> <p>λ 24 51 36°89 L 83 30 21°69 No. 58</p> <p>Muhammadpur, XXV. (Gorakhpur. Vide page 7—o.)</p> <p>λ 26 46 28°95 L 83 9 17°10 H 283 h 28 No. 27</p>	<p>Muhammadpur Masjid. (Azamgarh)</p> <p>λ 26 10 30°0 L 83 16 51°0</p> <p>Murádeo Building. (Benares)</p> <p>λ 25 13 18 L 83 0 47</p> <p>Murádeo Temple. (Benares)</p> <p>λ 25 13 19°1 L 83 0 47°2</p> <p>Murgari Hill Mark (heliotrope). (Mirzapur) On the highest part of the bluff.</p> <p>λ 24 7 6°32 L 83 16 38°34 No. 45</p> <p>Murli h.s. (Mirzapur) On a hill about 2 miles S. of the Ganges.</p> <p>λ 25 5 21°45 L 82 51 22°55 Nos. 104, 105</p> <p>Nandaur, XXVII. (Basti. Vide page 7—o.)</p> <p>λ 26 56 39°76 L 83 6 58°38 H 302 h 26 No. 29</p> <p>Nandganj Masjid. (Ghazipur)</p> <p>λ 25 32 34°3 L 83 27 5°2</p> <p>Narharpur Rāja's House, (Gorakhpur) W. kalas.</p> <p>λ 26 16 48°5 L 83 34 22°7</p> <p>Naugarh Building, (Mirzapur) Flag.</p> <p>λ 24 50 23°2 L 83 18 48°5 No. 63</p> <p>Pahária h.s. (Shahabad) On a small rocky hill covered with jungle and rising about 60 feet above the surrounding plain, 200 yards S.E. of the village of that name and 2½ miles N. of Rāmgarh; pargana Chainpur. A stone with ☉ engraved on it and covered over with a pile of stones, marks the station.</p> <p>λ 25 0 3°08 L 83 38 35°34 No. 69</p>	<p>Parmandápur Semaphore. (Mirzapur) About 3 miles N. of Ilia village.</p> <p>λ 25 7 42°8 L 83 22 58°2 Nos. 88, 89</p> <p>Parmit Temple. (Ghazipur)</p> <p>λ 25 31 37°4 L 83 31 55°0</p> <p>Patíta Fort. (Mirzapur) S.E. turret of palace.</p> <p>λ 25 3 5°3 L 82 59 47°0</p> <p>Pípardar h.s. (Mirzapur) On a hill about 1 mile E. of Pathári village. A platform marks the site of observation.</p> <p>λ 24 32 17°65 L 83 14 26°57 Nos. 32, 33</p> <p>Pirozpur Bridge. (Ghazipur) Over the Besu river.</p> <p>λ 25 39 31°5 L 83 31 56°4</p> <p>Pirozpur Factory, (Ghazipur) Godown.</p> <p>λ 25 39 34 L 83 31 55</p> <p>Rájabári, XXVI. (Gorakhpur. Vide page 7—o.)</p> <p>λ 26 54 3°04 L 83 18 2°67 Hs 267°89* h 28 No. 28</p> <p>Rāja Kirpál-ka-Pahār h.s. (Mirzapur) On a hill which is connected by a lower ridge with the table-land of the Bindhāchal and to the left of the road from Ahraura to Lauari by Amdar Ghat, and ½ a mile S. of Ahraura; pargana Bhoili. A small platform marks the station.</p> <p>λ 24 59 49°04 L 83 5 12°06 Nos. 95, 96</p> <p>Rájarh, XX. (Gorakhpur. Vide page 6—o.)</p> <p>λ 26 25 14°66 L 83 25 32°76 Hs 257°32* h 26 No. 22</p>

* This height refers to the mark-stone let into the ground floor of the tower.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Rámgarh Building. (Mirzapur) Centre of white house. λ 24 39 44·4 L 83 17 6·2 No. 57	Saipur Temple. (Gorakhpur) λ 26 43 43·9 L 83 23 30·5	Sikandarpur Siwála. (Mirzapur) λ 25 5 15·4 L 83 13 42·1 No. 85
Rámgarh Siwála, (Shahabad) Small. λ 24 58 26·1 L 83 37 6·8 No. 72	Samaspur House, (Mirzapur) Doorway near river. λ 25 6 30·3 L 82 53 23·2	Sikhári Factory, (Ghazipur) Bungalow chimney. λ 25 43 19·9 L 83 28 55·1
Rámgarh Temple. (Mirzapur) λ 25 7 56·7 L 82 49 35·8	Samenda, XV. (Azamgarh. Vide page 6—o.) λ 26 0 23·97 L 83 15 57·85 H _s 260·29* h 25 No. 17	Sikri, VII. (Benares. Vide page 4—o.) λ 25 12 2·53 L 83 15 14·76 H 293 h 27 Nos. 6, 9
Ramna House. (Benares) Puka kothi in the park. λ 25 14 55·1 L 83 3 47·7	Samra Semaphore. (Mirzapur) λ 25 7 7·2 L 83 14 59·5 No. 87	Sultánpur Bungalow, (Mirzapur) Chimney of bow room. λ 25 11 6·8 L 82 56 11·9
Rámnagar Fort, (Benares) Flag. λ 25 16 7·3 L 83 4 1·9	Saraia, XXIV. (Gorakhpur. Vide page 7—o.) λ 26 44 10·32 L 83 19 1·26 H _s 256·76* h 28 No. 26	Sultánpur Masjid, (Mirzapur) Highest minaret. λ 25 11 33·9 L 82 55 55·6
Rámnagar House. (Benares) A large old upper storied brick house on the river side, S. of the fort. λ 25 15 37·2 L 83 4 16·7	Saraia Temple. (Gorakhpur) In village. λ 26 44 6·0 L 83 18 52·7	Sultánpur Monument. (Mirzapur) Highest pillar in burial ground. λ 25 11 31·2 L 82 56 8·2
Rámnagar Staircase. (Benares) λ 25 16 7 L 83 4 2	Sauram Temple No. 1; (Ghazipur) Small. λ 25 31 43·3 L 83 27 53·6	Sultánpur Stables. (Mirzapur) λ 25 10 37 L 82 55 30 No. 110
Rámnagar Temple. (Benares) On ghat N. of the fort. λ 25 16 15·2 L 83 4 0·7	Sauram Temple No. 2, (Ghazipur) Large. λ 25 31 55·3 L 83 27 24·2	Sultánpur s. (Mirzapur) Within the village so called. λ 25 10 29·52 L 82 55 59·72
Rámpur House. (Ghazipur) Gosáin's house near village. λ 25 39 18·1 L 83 31 32·7	Sewádhi, XXXVIII†. (Palamow. Vide page 3—o.) λ 23 58 24·17 L 83 47 40·02 H 1956 h 2 No. 1	Sultánpur Temple No. 1. (Mirzapur) λ 25 10 19·4 L 82 55 36·2
Sabitpur Temple. (Fyzabad) λ 26 19 45·9 L 83 8 33·3	Shikárganj Building. (Mirzapur) λ 25 0 56 L 83 9 49	Sultánpur Temple No. 2. (Mirzapur) On ghat. λ 25 10 21·5 L 82 55 45·7
Sahesपुरa s. (Mirzapur) About ½ a mile S. of village so called. λ 25 10 2·56 L 83 0 11·32		Sultánpur Temple No. 3. (Mirzapur) Near the left bank of the Ganges. λ 25 10 40·5 L 82 56 8·9

* This height refers to the mark-stone let into the ground floor of the tower.

† Of the Calcutta Longitudinal Series.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
<p>Surharia Hill Mark. (Mirzapur) About 2 miles N.W. of Lendha village.</p> <p>λ 24 56 19.81 L 83 18 3.76 No. 66</p> <p>Surharia No. 1 h.s. (Mirzapur) About 1½ miles E. of Lowari village.</p> <p>λ 24 53 35.17 L 83 17 16.83 Nos. 59, 60</p> <p>Surharia No. 2 h.s. (Mirzapur) About 2 miles N. of Deokhar village.</p> <p>λ 24 52 39.98 L 83 18 2.98 Nos. 61, 62</p>	<p>Súrhaú Ghat (Pass) h.s. (Mirzapur) To the west of the pass and about 2 miles N.W. of Chirauli village. A platform marks the station.</p> <p>λ 24 37 4.19 L 83 1 54.20 No. 55</p> <p>Talia Indigo Factory, (Gorakhpur) Chimney of bungalow.</p> <p>λ 26 14 25.3 L 83 50 56.1</p> <p>Tamálganj Building. (Mirzapur) In village on bank of the river.</p> <p>λ 25 6 8 L 82 53 14 No. 106</p>	<p>Tári Factory, (Ghazipur) Bungalow.</p> <p>λ 25 34 22.8 L 83 39 2.9</p> <p>Tendua Masjid. (Mirzapur) On hill.</p> <p>λ 25 6 36.9 L 82 54 40.6</p> <p>Thiari House, (Mirzapur) Highest, in village.</p> <p>λ 25 3 35.6 L 83 21 31.7 No. 83</p>

March 1879.

J. B. N. HENNESSEY,

In charge of Computing Office.

List of Published Works of the Great Trigonometrical Survey of India.

An Account of the Measurement of an Arc of the meridian between the parallels of $18^{\circ} 3'$ and $24^{\circ} 7'$, being a continuation of the Grand Meridional Arc of India as detailed by the late Lieutenant-Colonel Lambton in the Volumes of the Asiatic Society of Calcutta. By Captain George Everest, of the Bengal Artillery, F.R.S., &c. London, 1830.

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List of Published Works of the Great Trigonometrical Survey of India—(Continued).

Account of the Operations of the Great Trigonometrical Survey of India—(Continued).

Volume VII. General Description of the Principal Triangulation of the North-East Quadrilateral including the Simultaneous Reduction and the Details of Five of the Component Series, the North-East Longitudinal, the Budhon Meridional, the Rangir Meridional, the Amua Meridional, and the Karara Meridional. Prepared under the directions of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.

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Do. II. The Great Arc—Section 24° to 30°, or Series *A* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.

Do. III. The Karachi Longitudinal Series, or Series *B* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.

Do. IV. The Gurhagarh Meridional Series, or Series *F* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.

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List of Published Works of the Great Trigonometrical Survey of India—(Continued).

Synopses of the Results of the G. T. Survey of India, &c.—(Continued).

- Volume VIII. The Great Arc—Section 18° to 24° , or Series *A* of the South-East Quadrilateral.
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- Do. IX. The Jabalpur Meridional Series, or Series *E* of the South-East Quadrilateral.
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- Do. XIII. The East Coast Series, or Series *C* of the South-East Quadrilateral. By Major-
General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and
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- Do. XIV. The Budhon Meridional Series, or Series *J* of the North-East Quadrilateral.
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- Do. XV. The Rangír Meridional Series, or Series *K* of the North-East Quadrilateral.
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- Do. XVI. The Amúa Meridional Series, or Series *L*, and the Karára Meridional Series,
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